

THE IRON AGE

PRODUCTION -- MANAGEMENT

NOVEMBER 2, 1933

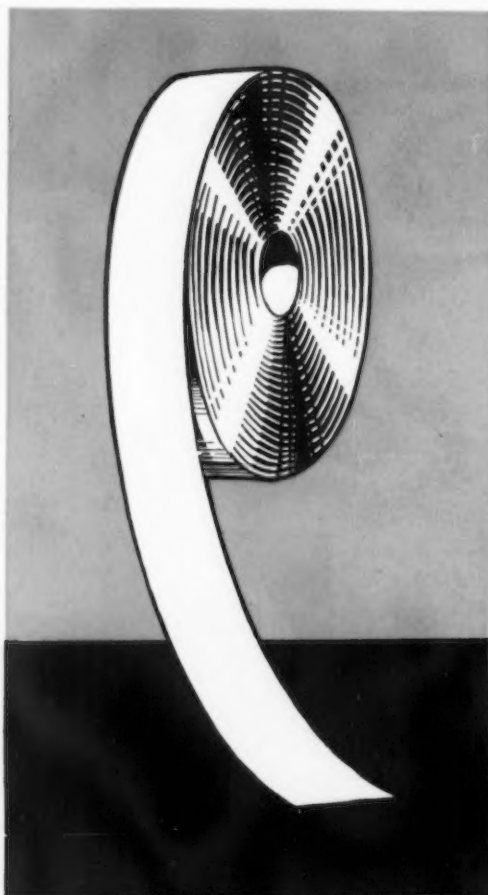
PROCESSES -- NEWS



THE BUYER'S WAY OUT IS THE SELLER'S WAY IN

- Mandatory increases in manufacturing costs have followed the stepping up of wages and the cutting down of hours under the NRA. These put an additional premium on intelligent buying of materials, machinery and services.
- Intelligence in buying, under the codes, is not demonstrated by the faculty of obtaining bargains in price. It is demonstrated by the ability to secure *value in use*.
- The higher costs of industrial production will become your strongest sales stimulators if you can convince the buyer that his way out coincides with your way in.
- The advertising pages of The Iron Age are an exposition of *value in use*. They afford the seller an opportunity to find his way in by demonstrating the capacity of his product to either justify or reduce the buyer's higher costs. And they show the buyer his way out of the dilemma of larger payrolls and smaller profits.

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△△ THE IRON AGE △△ November 2, 1933 △△

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THE IRON AGE

NOVEMBER 2, 1933

ESTABLISHED 1855

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From Liquor Racket to Labor Racket?

EXPERIMENTS are essential to industrial progress. And perhaps social experiments are necessary too, if human relations are to keep pace with science and invention.

There is one great difference, however, between technical and social experimentation. The technical experimenter tries out his idea on small lots. He finds out that it will work before applying the improvement to the entire output of the factory. The guinea pig method cannot be applied to social experiments. They are made upon *all* of the people.

Probably that is the reason why many people have regarded social experimentation with some misgiving. For it is undoubtedly true that the vast changes brought about by them form golden opportunities for the unscrupulous self-seekers who use them to seize power or plunder.

THE "noble experiment" was a case in point. It was conceived with high purpose, but under its fair exterior there bred and multiplied a new and despicable creature; a combination of wolf and rat known as the "liquor racketeer."

These rodents will shortly be driven from their breeding place by the collapse of prohibition. They will seek a new home. Will the liquor racketeer become the labor racketeer, infesting the crannies and crevices in the new noble experiment in mass unionization?

Where else could they thrive better? Racketeering is founded upon the ruthless capitalization of human wants. For every man who wants liquor there are three men, at least, who want to get or to hold a job—and who, if necessary, will pay to get what they want.

The tool of racketeering is intimidation. Where else is it more easily applied? Where else can a few reckless hot heads more readily control and dominate the actions of an unwilling but less reckless majority?

WE are told that the answer to this lies in regulation. Regulation by whom? Has the Government, after 10 years of trying and the expenditure of hundreds of millions, demonstrated ability to control the liquor racketeers?

Regulation by union chiefs? Has the A. F. of L., during past years, shown either willingness or ability to "clean house"? And if it has not or could not do this in the days of its 2,000,000 stable membership, how can it hope to exercise control and keep out the racketeers when it is mushrooming in membership and dispensing new charters with unparalleled prodigality?

If the liquor racketeer becomes the labor racketeer, the last state of industry will be worse than the first, for employers and employees alike.

New Approaches to the Study of

By E. J. JANITZKY

Metallurgical Engineer
Illinois Steel Co., South Works, Chicago

THE following article is presented to record an analysis of the shape (contour) of deformation of the steel tensile test specimen, the interrelation of elongation to reduction of area as obtained by the tensile test and the apparent relation of deformation to other physical properties as:

- 1—Stress (tensile and yield point stress).
- 2—Notch toughness (Izod impact).
- 3—Machinability.

Contour of Deformation

The shape of the deformation contour, that is, the actual contour of the tensile test piece at the moment of rupture, resembles closely the curvature of the witch of Agnesi. However, this specimen contour can not be geometrically developed from a circle as may be done in the witch of Agnesi; hence an ellipse was chosen as the nucleus for developing this curvature. Fig. 1 illustrates a fractured specimen and the constructed deformation curvature as developed by the Agnesi method. The small axis of the ellipse is

equal to the difference between the radii, that is, the radius of the original specimen before deformation minus the radius of the reduced section after deformation. The large axis of the ellipse is half the distance between the turning points or points of inflection of the curve.

From the method of construction of the curve it is apparent that the general shape of this contour curve will be repeated when:

- 1—The large axis of the ellipse is held constant and the small axis is variable, or
- 2—The large axis of the ellipse is variable and the small axis is held constant, or
- 3—The large and the small axes of the ellipse are both variable. In this case the increase or decrease of the axes are so that their ratio is constant.
- 4—The large axis of the ellipse is infinite and the small axis variable.

From item 1 it may be inferred that (in standard specimens) two equal elongation percentages may show different reduction of area percentages.

From item 2 we may infer that the reciprocal may be expected. Item 3 expresses that (in standard specimens) when the ratio of the two variable axes is constant a similarity of deformation curvature may be expected. Item 4 expresses the deformation, that is elongation without necking, that is experienced in certain austenitic steels. In this case the deformation represents the maximum obtainable. Other austenitic steels, e.g. 18-8 stainless, deform also throughout the entire gage length but neck.

Deformation as Percentages of Elongation and Reduction of Area

For the analysis of deformation as expressed by elongation per cent and reduction of area per cent, let us use the data obtained by the cooperative tests on chrome vanadium steel (S.A.E. 6130) and nickel chrome steel (S.A.E. 3130), conducted by the Iron and Steel Division of the American Society of Automotive Engineers¹. The data represent standard deviations of the mean derived from frequency curves.

The standard deviations of tensile strength, tensile yield point, elongation per cent and reduction of area per cent and the heat-treatment given to the steels in 1 in. round sections are exhibited in Table 1.

For both grades of steel the minima and maxima of elongation and reduction of area (standard deviations) were plotted: the former as the abscissa, the latter as the ordinate. See Fig. 2. The trend of these points is a curve whose equation is:

$$R = \frac{100}{\frac{d}{E} + 1} \quad (1)$$

where R = reduction of area per cent
 E = elongation per cent
 d = constant, herein termed "deformation constant."

This equation represents a family of curves of constant d value. This

¹S. A. E. Journal, Vol. XXII, No. 1, January, 1928, pp. 55-64, and Vol. XXIX, No. 6, December, 1931, pp. 480-481.

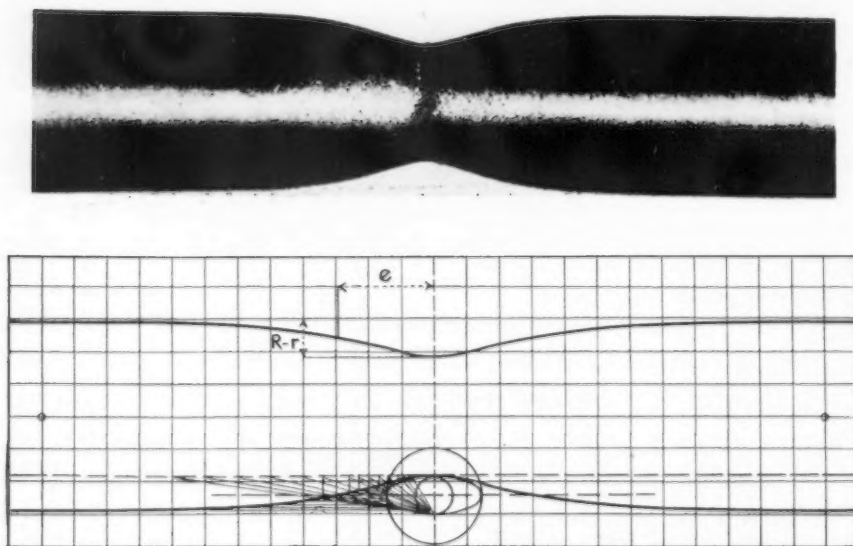


Fig. 1—Contour of curvature of deformation as constructed from a fractured specimen. Deformation constant $d = 11.3$. Tensile strength = 136,250 lb. per sq. in. Elastic limit = 123,000 lb. per sq. in. Elongation = 18.5 per cent. Red. of area = 62.3 per cent.

of the Deformation of Steel

SEVERAL excursions away from the well-trod paths of the investigations of the physical properties of steels have been made by the author. They may well mark ways that will shed new light on the interrelations of stress and deformation.

Study of the contour of a tensile test specimen led to developing a relationship between elongation and reduction of area that Mr. Janitzky terms a deformation constant. This has different values dependent in part on the size of the quenched section and the quenching speed and medium. Also, in his opinion, the deformation constant is an index to machinability, and it opens a field for the evaluation of the plasticity of steel. The potency as to hardness of nickel-chrome steels, as due to both the nickel and chromium, is regarded as proportional to the product of the contained nickel and chromium. Such are some of the contentions of an article which is a veritable *multum in parvo*.

family of curves is shown in Fig. 2. The d value for each curve is derived by rewriting equation (1) as

$$d = E \left(\frac{100}{R} - 1 \right) \quad (1A)$$

The evaluation of the deformation constant by equation 1A is only applicable for steels that do not deform throughout the entire gage length. In cases where steels deform throughout the entire gage length and neck, the term R of equation 1A changes to $R-r$; r denotes the reduction of area at the marks of the gage length.

Substituting the percentages of elongation and reduction of area (as given in Table 1) in equation (1A), and solving for d , one notes the interesting fact that d oscillates around 11.5 in both grades of steel. (See Table 2.) For reasons of simplicity let us call d which appears to have a physical significance the deformation constant.

Thus we may infer that steels of the same hardening potency when quenched in the same section (mass) from the appropriate temperature and tempered at ascending temperature possess the same deformation constant.

From the analysis of the shape (contour) of deformation, one is aware that the deformation constant may vary up to 100.

Thus when we inquire as to the cause of variation of the deformation constant by perusing the Effect of Mass in S.A.E. Handbook, 1931, pp. 533-554, we arrive at the following conclusions:

- 1—Steel of the same hardening potency, heat treated in the same section (mass) but variable quenching speed (water-oil-air) will possess a larger deformation constant the

- less drastic the quenching speed.
- 2—Steels of the same hardening potency quenched in various sections (mass) at the same temperature in the same coolant and tempered at the same temperature, will increase the deformation constant as the mass increases.

Hence increasing of mass or lowering the "drasticity" of the coolant exert the same effect in regard to the magnitude of the deformation constant.

Obviously it is pertinent to refer

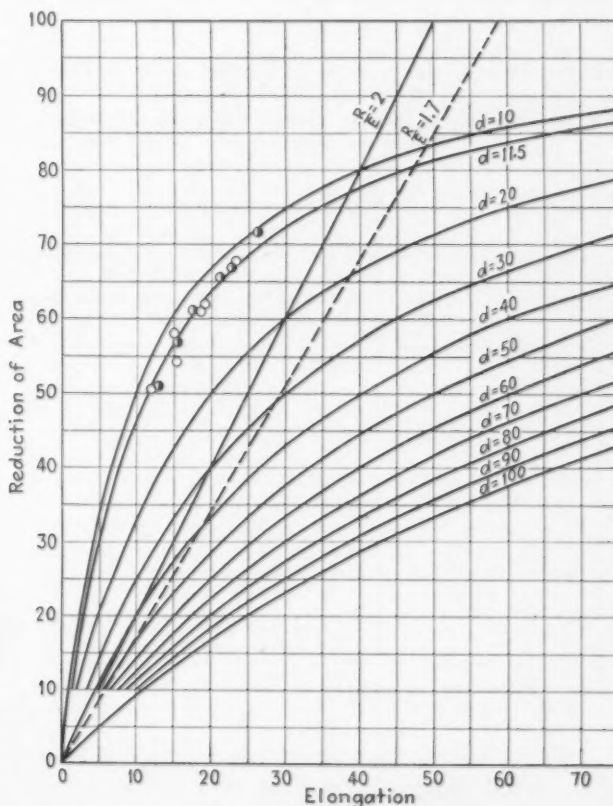
the deformation constant to stress, which is the cause of deformation. Thus for comparative purposes the various deformation constants at the same tensile strength open a field for evaluation of plasticity of steel.

It is apparent that at the same tensile strength, the larger the deformation constant the more plastic the steel.

Hardening Potencies of Nickel-Chrome Steels

It will not be amiss to record an interesting observation on the hardening potency of nickel and nickel-chrome steel of the same carbon content, namely S.A.E. 2340, 3140, 3240, 3340, water quenched and tempered at 1000 deg. F. in sections from

Fig. 2—Diagram of deformation constant.



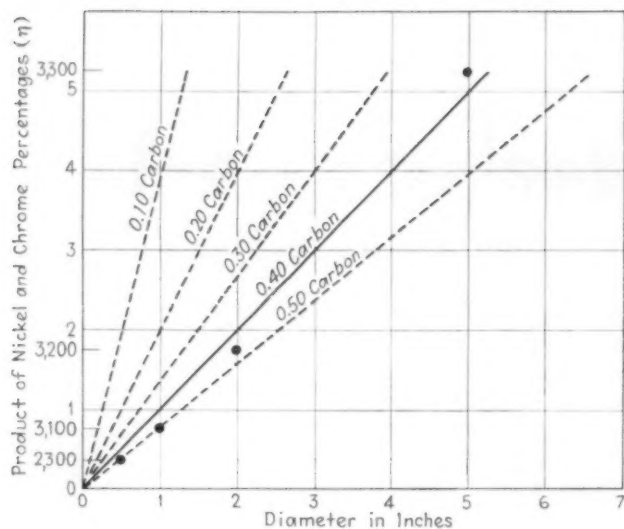


Fig. 3—Diagram representing mass effect for a tensile strength of 155,000 lb. per sq. in. in section from 0.5 in. to 5 in. Water quenched and tempered at 1000 deg. F., of S.A.E. grades 2340, 3140, 3240, 3340. Dotted lines are interpolation of the same tensile strength (155,000 per sq. in.) for different carbon content. Heavy line drawn through actual data.

0.5 to 5 in.² After plotting the product of nickel and chromium as ordinate and the corresponding diameter of the section as abscissa for each 155,000 p.s.i. tensile strength test one notes that all these points closely array themselves around a straight line. See Fig. 3. The slope of this line may be expressed by the following equation:

$$\tan \alpha = \frac{\eta}{D} \quad (2)$$

where α = angle of this line with the abscissa
 η = the product of nickel-chrome
 D = cross-sectional diameter of bars.

The value of η in this equation is to be used as the product of nickel content and chrome content only when the nickel content is larger than the

chrome content, that is until the chrome per cent is equal to the nickel per cent. Thus in the S.A.E. 3300 series, when nickel is 3.5 per cent and chrome is 1.75 per cent, the product η would be $3.5 \times 1.75 = 5.25$.

In considering straight nickel steel, it is to be remembered that in commercial steels there is usually a small contamination in steel presumably free of alloys. Thus 3.5 nickel steel having 0.10 per cent chrome as contamination, would have a product of 3.5×0.10 , or 0.35. Although this method of assuming 0.10 per cent as factor might be considered a mathematical trick, nevertheless the fact remains that with the use of such factors one arrives at a very good approximation of the actual physical properties.

Below are given the common nickel-

chrome and nickel steels of the S.A.E. series with corresponding η , carbon content not being considered.

S. A. E. Grade	Ni	Cr	η
3300	3.50	1.50	5.25
3400	3.00	.75	2.25
3200	1.75	1.00	1.75
3100	1.25	.60	.75
2300	3.50	.10	.35

Any other alloy combination may be interpolated as to η when equivalent hardening potency is evaluated. Therefore, by using the above product η in the formula noted, we are able to correlate the hardening potencies in the different nickel-chrome steels.

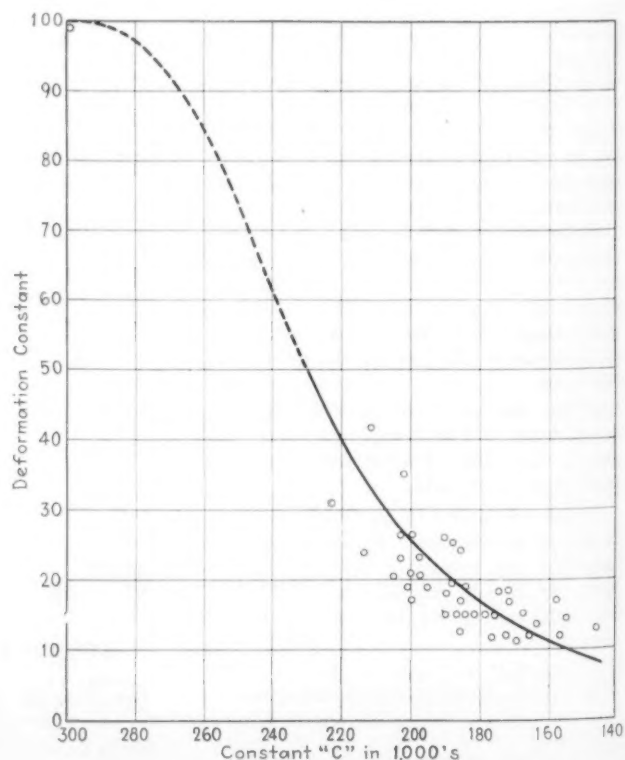
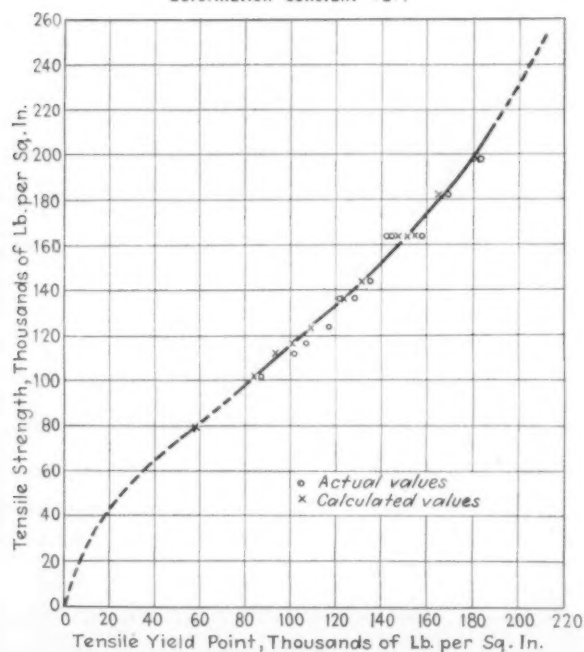
As previously mentioned the steel grades dealt with are nickel and nickel-chrome steels of 0.40 carbon and with manganese content appropriate to S.A.E. specification; or in other words, the carbon is constant with variable product of nickel and chrome percentage π . It is obvious that with decreasing carbon content the hardening potency of the same grades η will be lowered and that at a lower carbon content the sections will have to be decreased in order to yield the same tensile strength. Hence, lowering of carbon content at the same grade of steel will be in direct ratio to the sectional diameters. However, decreasing carbon content while retaining the same section will be in inverse ratio to the product of nickel and chrome percentage. Obviously a similarity is extant when the coolant is less drastic.

Interrelation of Stress to the Deformation Constant

Table 2 reveals that both grades (S.A.E. 3130 and 6130) under con-

Fig. 4—(Below), Relation of tensile strength to tensile yield point for deformation constant, $d = 11.5$.

Fig. 4a—(At right), Diagram giving "C" for corresponding deformation constant (d).



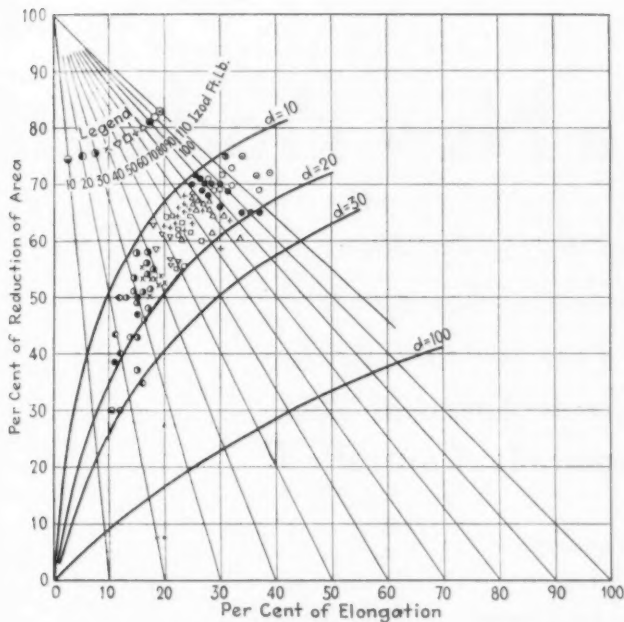
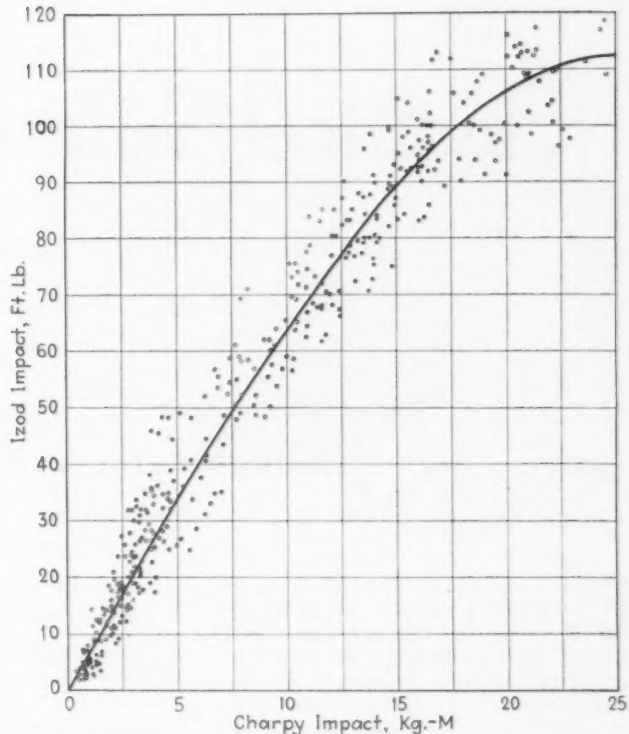


Fig. 5—(Above), IZOD impact diagrams for various values of elongation and reduction of area.

Fig. 6—(At right), Conversion curve showing relation of IZOD impact to Charpy impact.



sideration, as previously mentioned, have practically the same deformation constant. Plotting from Table 1 tensile strength as the ordinate and tensile yield point as the abscissa we obtain a curve (see Fig. 4) which follows closely the equation,

$$Y = \frac{300,000}{\left(\frac{c}{T}\right)^2 + 1} \quad (3)$$

where Y = tensile yield point in lb./sq. in.
 T = tensile strength in lb./sq. in.
 c = a term which changes with the deformation constant.

The c terms for the various deformation constants are given in Fig. 4A and have been derived by solving equation (3) for

$$c = T \sqrt{\frac{300,000 - Y}{Y}} \quad (3A)$$

and substituting the stresses. The data so obtained were then plotted against the corresponding deformation constants. Table 3 exhibits actual and calculated tensile yield point strength. The actual data are taken from Table 1.

From the cooperative tests and other collected data it may be inferred that any steel when quenched from a certain temperature in a certain section and tempered to the same tensile strength will possess at the same deformation constant, a fixed ratio between tensile strength and tensile yield point. Hence one may infer that there exists a relation between the shape (contour) of a deformed specimen and the ratio of tensile strength to tensile yield point.

Relation of Deformation to Notch Toughness Tests

The idea that reduction of area and elongation are related to the notch

toughness test is generally assumed, but the plot of either of the deformation properties against IZOD impact gives an ambiguous answer. However, it appears that a usable relation may be established when both elongation per cent and reduction of area per cent are combined, similarly to the plotting of the diagram of the deformation constant. See Fig. 5. Here, instead of proceeding as in Fig. 2, where the deformation constant was recorded, we now plot the IZOD impact values corresponding to a certain elongation per cent and reduction of area per cent. One perceives that equal IZOD impact values group themselves around lines radiating from the 100 per cent reduction of area point

on the ordinate. Thus we are aware that equal IZOD impacts possess various deformation constants. However, the deformation constants of equal IZOD values have a linear trend. Incidentally the IZOD impact values are tangents (when multiplied by 100) of the angles made by the line drawn through the plotted points and through the 100 per cent reduction of area point with the ordinate.

e.g., the 100 ft.-lb. line has a tangent of 1.0, the 90 ft.-lb. line 0.9, etc.

Hence the impact value in foot-pounds for any deformation will be equal to the tangent multiplied by 100.

The IZOD impact is expressed by the
(Concluded on Page 70)

TABLE 1—Properties of Two Steels Tabulated for Studying Deformation Relations

	SAE 6130 quenched from 1600 deg. F. and tempered as shown		SAE 3130 quenched from 1525 deg. F. and tempered as shown	
	800 deg.		800 deg.	
	Standard deviations		Standard deviations	
Tensile strength, lb. per sq. in.	164,000	198,000	164,000	182,000
Yield point, lb. per sq. in.	142,000	182,000	144,000	168,000
Elongation, per cent	15.3	12.2	15.5	12.9
Reduction of area, per cent	58.0	50.5	57.0	51.0
	1000 deg.		1000 deg.	
Tensile strength, lb. per sq. in.	136,000	164,000	124,000	144,000
Yield point, lb. per sq. in.	122,000	157,000	117,000	134,000
Elongation, per cent	18.6	15.2	21.2	18.0
Reduction of area, per cent	61.5	54.7	65.5	61.0
	1200 deg.		1200 deg.	
Tensile strength, lb. per sq. in.	112,000	137,000	102,000	117,000
Yield point, lb. per sq. in.	102,000	128,000	87,000	107,000
Elongation, per cent	23.6	19.1	26.4	22.8
Reduction of area, per cent	67.8	62.0	71.8	67.8

Electrical Strip—a New Product

*Manufacturing Process in Republic Plant Is
Featured by Special Heat-Treating Equipment—
Continuous-Type Electric Furnace Has Artificially
Controlled Atmosphere—Speed of Strip
Through Furnace Automatically Controlled*

By F. L. PRENTISS

Resident Editor, The Iron Age, Cleveland

ELECTRICAL strip, which is a new steel mill product, is being manufactured by the Republic Steel Corp. at its Warren, Ohio, works under a recently developed process which includes special heat treatments in controlled atmosphere in a continuous-type electric furnace of new design. The special heat-treating operations include one which may be called partial normalizing to take out part of the strains in the steel, and another, an annealing operation, to take out "coil set" after the steel is box-annealed in coils. After the last heat-treating operation the strip is allowed to cool flat and then it is re-coiled, inspected, tested and shipped. When this strip is uncoiled as it is fed into a punch or blanking press for making laminations or for other press operations, it comes from the coil in a perfectly flat condition.

The strip is made of steel containing silicon in various amounts and is hot-rolled to an intermediate gage and then cold-rolled to the finish gage. It is then subjected to the heat-treating operations.

The first heating operation is at a temperature of approximately 1900 deg. F., the actual temperature de-

pending on the grade and gage. This heating is done in a slightly oxidizing atmosphere so that the steel can be subsequently box-annealed at the required annealing temperature without sticking. During the box annealing some of this oxide is removed. The second heat-treating operation in the continuous furnace is at a temperature of 1450 to 1500 deg. F. either in a slightly oxidizing or slightly reducing atmosphere, thus producing strip either with a slightly oxidized or deoxidized surface.

Furnace Can Handle Strip Up to 36 In. Wide

The movement of the strip is under automatic speed control from the time it is unwound from coils at the front of the continuous furnace until after the heat-treating operation. Its movement is in a straight line from the time it starts from the coils back of the loading end of the furnace until it is recoiled on reels at the other end

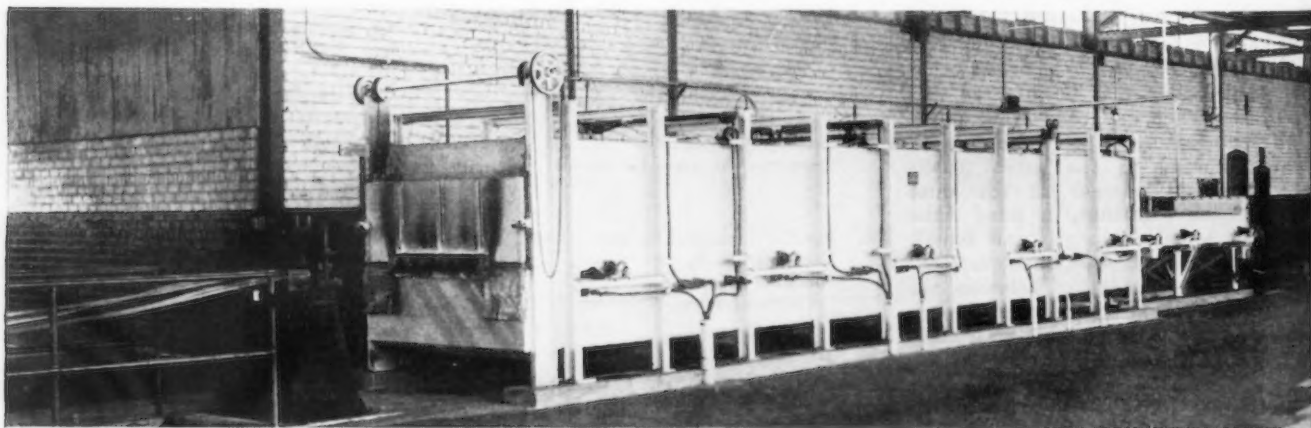
of the department. The furnace has a heating chamber 32 ft. long and 42 in. wide and a cooling chamber 16 ft. long. Electrical strip up to 28 in. wide is being made in the furnace, which will accommodate widths up to 36 in. In narrow widths four strips are handled through the furnace at a time.

The steel moves through the furnace on eight driven rolls 4 in. in diameter, tubular in form and of cast chrome-nickel steel having the necessary heat-resisting properties. Five rolls are in the heating chamber and three in the cooling chamber. These serve as moving supports for the strip.

The rolls are driven by an endless chain that engages sprockets on the rolls, from an adjustable speed motor through a worm reduction gear with a 4 to 1 speed adjustment. Rolls are supported by ball bearings outside the heating chamber.

Has Five Heating Zones

The furnace, which is of 400 kw. total capacity, is divided into five heating zones, each automatically controlled. As operated, there is a slight increase in heat from one zone to the



Continuous electric furnace used for heat-treating electrical strip in controlled atmosphere. Four strips, if narrow widths are being heat-treated, pass through the furnace at one time, the speed of travel being automatically controlled. At the front of the furnace is a work guide and wiper.

next, the temperature at the last zone being about 200 deg. above that of the first zone. The strip moves through the furnace at a speed range of from 8 to 32 ft. per min., depending on the grade and gage.

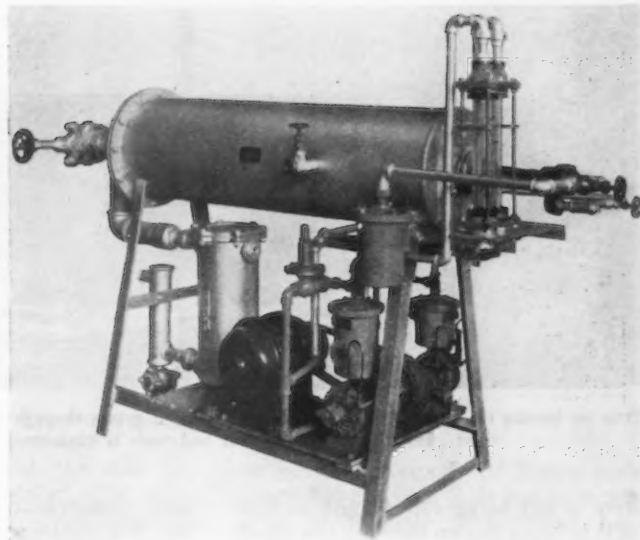
The heating units are mounted in the roof and on the floor below the rolls. In the cooling chamber there are cooling pipes through which water is circulated by a motor-driven pump. These pipes extend longitudinally through the chamber above and below the work. An adjustable door between the cooling and heating chamber permits the adjustment of the width of the opening according to the gage of strip and thus preventing heat from escaping into the cooling chamber.

Atmosphere Controller Is Feature

Gas for maintaining the desired atmosphere in the furnace is produced in an atmosphere controller located at the side of the furnace. This is arranged to produce an atmosphere having protective properties by the partial combustion of natural gas. Nitrogen predominates in the gas, which may be oxidizing, neutral or moderately reducing.

The gas and air are delivered to the burner by two motor-driven compressors. The mixture of gas and air is controlled by hand-operated valves and the amount of each is accurately shown by Rotameters, one for gas and one for air, which are visual flow indicators. These indicators are calibrated in cubic feet per hour and are controlled by floats in glass tubes of the visible indicators. The gaseous products of combustion pass from the retort through two condensers in which the bulk of the moisture is taken out, and from the condensers the gas passes into the furnace through three distributing points at the top. The pressure from the compressors assures the uniform flow into the furnace. The quality of the gas in the furnace is controlled by the regulation of the mixture of gas and air. A mixture of six parts of air to one part of gas is said to produce an efficient protective atmosphere and the

Front view of furnace atmosphere controller. The quality of gas that is delivered to the furnace is controlled by the supply of air and gas delivered to the gas-processing equipment. The visual flow indicators, at the right, show the volume of air and gas that is being delivered to the burners.



large percentage of air makes it a very economical atmosphere.

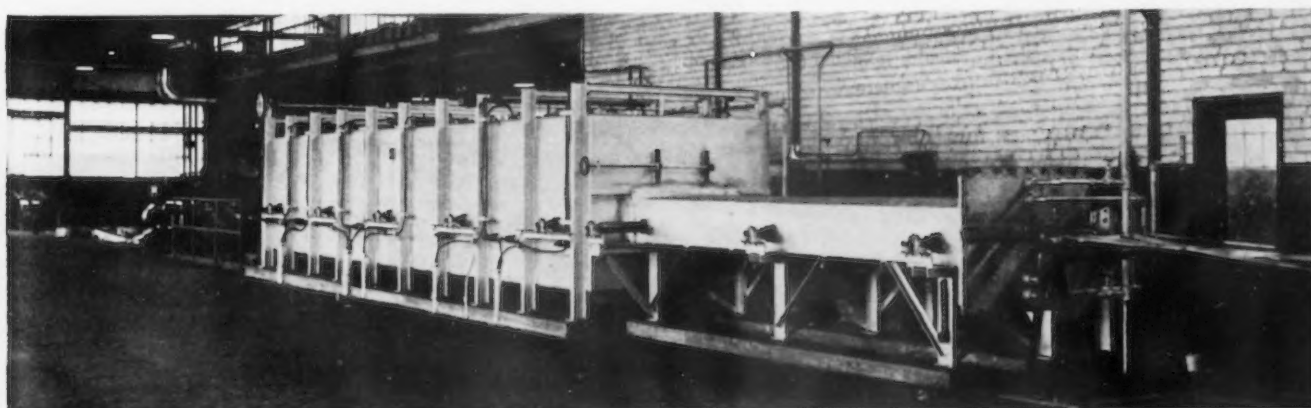
Coils of strip in the smaller sizes are fed into the furnace from payoff reels in the floor, and very large coils are fed from a coil box. Back of the loading end in the line of travel is an electric welding machine with which the end of one piece of strip is lap-welded to the next strip. When a piece is nearly through the furnace the end is pulled forward a few feet by hand and the slack sags down into a pit between the welder and the furnace. By the time the slack is taken up by the movement of the strip in the furnace the weld is completed so that there is no interruption during the welding operation. A work guide is located in front of the furnace entrance, and combined with it there is a wiper for removing grease from the strip.

Leaving the cooling chamber, the strip is drawn through a pair of pinch rolls, the speed of which controls the speed of travel through the furnace. A uniform speed is maintained by having the motor that drives the furnace rolls synchronized with the motor that drives the pinch rolls.

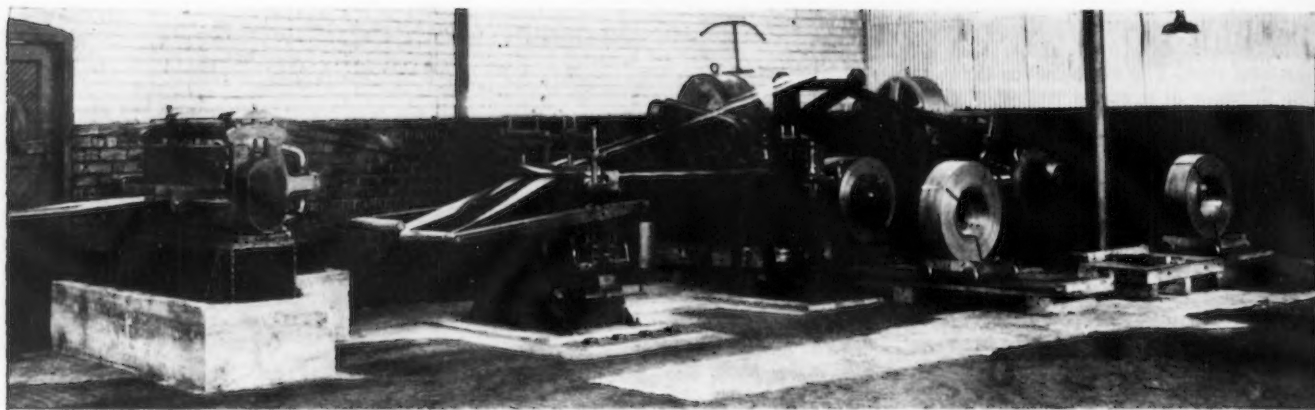
The pinch rolls are located about 100 ft. from the discharge end of the furnace in order to allow the strip, which leaves the cooling chamber at 500 to 600 deg. F., to further cool off before being coiled. During this travel the strip, which is held in slight tension, moves over idler rolls that serve as supports.

Speed of Reels Automatically Controlled

Back of the pinch rolls are two reeling machines equipped with 30-in. face by 16-in. diameter expansion heads. An unique method is provided for controlling the speed of the reels. Were an uniform speed maintained the travel of the strip would have to increase as the diameter of the coils grew larger. Speed of the reel motors is automatically controlled by a set of counterweighted fingers controlling a roll that contacts with the upper surface of the strip. When the strip is pulled taut between the pinch rolls and reels the finger roll is raised up and this movement automatically cuts down the speed of the reel motor. When, with the reduced reel speed, the



Discharge end of the furnace, showing cooling chamber in which cooling pipes are provided. Artificial atmosphere is produced in a combustion-type atmosphere controller located along the wall at the right side of the furnace.



Strip on leaving the furnace, passing over idler rolls, is drawn through a set of pinch rolls at the left and is coiled on one of the two reels at the right. Between the pinch rolls and reels is equipment that automatically controls the speed of the reel motors.

strip is not being coiled quite so fast as it is being drawn through the pinch rolls, the sag that develops in the strip allows the fingers to drop down and this causes the reel motor to speed up.

In addition to the usual hand lever control equipment for the pinch rolls and reels, there are four foot-operated push buttons in the floor at the side of the pinch rolls for emergency control of the reels, a high and low speed control for each reel.

The reel heads are driven in and out by separate motors. When the coil is finished, it is discharged from the head by drawing the head back into the housing and the coil drops on to a buggy from which it is handled by a chain hoist. Coils have 16 in. inside diameter and are made up to 36 in. outside diameters. Four strips can be coiled on a reel at one time.

The control equipment located in an adjoining room includes one panel for controlling the speed of rolls in the furnace, the pinch rolls and reels through a Selsyn indicator set, and a second panel for controlling the fur-

nace temperatures. The latter panel has five sections, one for each heating zone. Temperatures are recorded and controlled by Leeds & Northrup Micromax instruments that are mounted on the panels.

Magnetic sheets must have qualities that assure low energy loss and high permeability. Heretofore it was thought possible to produce steel with these qualities only in the form of hot-rolled sheets. The manufacture of electrical strip was regarded as impossible because of the amount of cold rolling required to reduce the material to gage. After considerable experimental work the Republic Steel Corp. succeeded in producing electrical strip several years ago. About three years ago it put some of the strip on the market in a small way by submitting it to various users. They, it is stated, have found it superior to sheets for electrical purposes in both magnetic losses and permeability, and also in lower fabricating costs which result from providing coiled strip with "coil set" removed, permitting the steel to be fed in a perfectly flat form from coils into a punch or blanking press.

The strip is being made in standard widths of 2 to 12 in. and in nine gages from 0.0125 to 0.031 in. It is made in seven grades for use in the manufacture of transformers, dynamos, motors and armatures. The silicon content ranges from 4.5 per cent for extra special transformer grade down to 0.5 per cent for an armature grade. Five grades having silicon content from 2.5 to 4.50 per cent are non-aging. Two grades with silicon content of 0.5 per cent and 1.0 per cent are slightly aging.

The electrical strip and the process for making it are covered by patents issued and pending held by E. M. Freeland, sheet engineer of Republic Steel Corp., and that corporation manufactures the strip under a license. Patents have also been granted in several foreign countries.

The continuous electric furnace and furnace atmosphere producer were built by the General Electric Co., which also supplied the furnace control equipment. The reels were built by the Aetna-Standard Engineering Co., Youngstown.

Seven New Welded Tanks Built at Houston, Texas

SEVEN new 93,000 barrel tanks provide additional storage facilities for the Sinclair Refining Company at Houston, Texas. These tanks are 120 feet in diameter, 46 feet 4 inches high and are arc welded throughout.

The sides of the tanks are butt welded. The plates are flush on the inside to form a cylinder of uniform diameter from top to bottom, for

the efficient operation of floating roofs. All tanks are equipped with Wiggins floating roofs. The roofs and bottoms are lap welded.

These tanks which add 651,000 barrels capacity to Sinclair facilities were built by The Chicago Bridge and Iron Works using Fleetweld electrodes and machines manufactured by The Lincoln Electric Company, Cleveland, Ohio.



The Structure of an Alloy Steel

By OWEN W. ELLIS

Director of Metallurgical Research
Ontario Research Foundation, Toronto, Canada

It was previously found¹ that the production of the Widmanstätten structure in the larger grains of steel samples containing both large and small crystals is facilitated as its maximum heating temperature approaches 850 to 900 deg. C. The following is an investigation of the behavior of the steel samples during cooling from 1035 deg. C. at a predetermined rate.

Each of a series of ten samples was heated to 1035 deg. C. (1895 deg. F.) and then allowed to cool to a predetermined temperature, at which point it was quenched for the purpose of judging what structural changes, if any, the samples had undergone during cooling.

The samples were quenched at the following temperatures: 700, 675, 650, 625, 600, 575, 550, 525, 500, and 475 deg. C. Cooling curves of all the samples were made and subsequently replotted. The replotted curves have been reproduced in Figs. 24, 25, and 26.

Four of the samples (N.S. 146, 145, 144, and 147) had structures of the type shown in Fig. 28; four (N.S. 136, 137, 138, and 141), of the type shown in Fig. 29; and two (N.S. 142 and 143), of the type shown in Fig. 30.

Samples N.S. 146 (Qu. 700 deg. C.), N.S. 145 (Qu. 675 deg. C.), N.S. 144 (Qu. 650 deg. C.), and N.S. 147 (Qu. 625 deg. C.) were martensitic. In samples N.S. 144 and N.S. 147 ferritic areas at many points in the section indicated some transformation of face-centered solid solution at the boundaries of the grains. Fig. 28 shows the structure of N.S. 144. Ferritic areas are clearly visible.

Cooling Rate Depresses A_{r_3}

It would appear that with the rate of cooling employed in this set of experiments the A_{r_3} point is depressed to a temperature between 675 and 650 deg. C. since no body-centered solid solution was present in sample N.S. 145 (Qu. 675 deg. C.), whereas in sample N.S. 144 (Qu. 650 deg. C.) quite a few ferritic laminae had started to form.

Between 625 and 600 deg. C. par-

tial transformation of the still untransformed face-centered solid solution occurred. This transformation, which resulted in the formation of conglomerate, started at points in the vicinity of the ferritic laminae throughout the sample (see Fig. 29). Those portions of the face-centered solution, which remained unchanged between 625 and 600 deg. C., underwent transformation on quenching, appearing in the quenched sample with a martensitic structure.

Although the conditions of heating and cooling samples N.S. 136, 137, 138, and 141 appeared to be so nearly identical as to be indistinguishable, the rates of cooling of the samples to the quenching temperature, as observed by the thermocouple in the sample, were appreciably different, as may be seen by reference to Figs. 25 and 26. However, by fitting the curves shown in Figs. 24-26 to curves of similar

UNDER suitable cooling conditions, alloy steels are shown to have four critical points. At the A_{r_3} point part of the face-centered solid solution transforms into body-centered solid solution. At the A_{r_1} point, estimated face-centered solid solution, in the vicinity of body-centered solid solution already formed, transforms into a "conglomerate" of body-centered solid solution and carbide of iron. At the A_{r_3} point, face-centered solid solution, heretofore unaltered, changes into body-centered solid solution, whereas the body-centered solution precipitates out in the form of needles. The accompanying material was presented at the A.S.S.T. convention, and continues the initial investigation presented in THE IRON AGE of Sept. 28. The concluding portion, consisting of discussion of theory relative to the formation of various steels and a new constitutional diagram for quenched steels, will appear in a subsequent issue.

slope, but covering the temperature range 850-350 deg. C., it has been possible to estimate what would have been the cooling times of the samples over this range, had they not been quenched. Table IV gives the results of these experiments.

The average cooling time (850-350 deg. C.) for the series was roughly 350 sec. Such variations in the proportions of conglomerate as were observed in samples N.S. 136-N.S. 143 supported the view that the greater the rate of cooling, the less are the number of transformation foci which form during cooling of the steel from A_{r_3} to A_{r_1} .

It would appear that with a cooling time (850-350 deg. C.) of about 350 sec., (1) transformation of face-centered solid solution (A_{r_3}) commences within the temperature interval 675-650 deg. C., and (2) transformation of those portions of the face-centered solid solution in close proximity to the body-centered solid solution which has already formed (A_{r_1}) occurs within the temperature interval 625-600 deg. C.

Transformation of Solution

Turning to Fig. 30, which is representative of samples cooled below 525 deg. C. before quenching, this shows the structure of sample N.S. 142, quenched at 500 deg. C. It will be seen that those portions of the face-centered solid solution which had not undergone decomposition above 525 deg. C. had begun to transform within the temperature interval 525-500 deg. C. Blades of body-centered solid solution can be seen in the martensitic matrix which was formed in the steel as a result of quenching.

The difference between the structure of steels quenched from above and below 475 deg. C. is brought out rather more clearly in Figs. 31 and 32. Fig. 31 shows the structure of sample N.S. 142; Fig. 32, at the same magnification, the structure of an unquenched sample cooled from 850 to 350 deg. C. in 350 sec. In Fig. 31 the blades of body-centered solid solution lie in a matrix of martensite, while in Fig. 32 these blades are embedded in conglomerate.

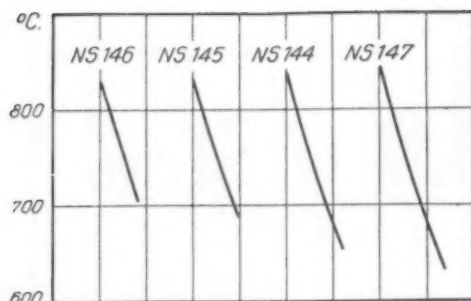


Fig. 24—Cooling curves (upper left) of steels heated to $\theta_{max} = 1035$ deg. C. and quenched at 700, 675, 650 and 625 deg. C. respectively.

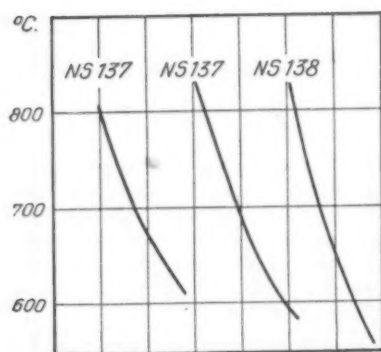


Fig. 25—Cooling curves (at left) of steel heated to $\theta_{max} = 1035$ deg. C. and quenched at 600, 575, and 550 deg. C. respectively.

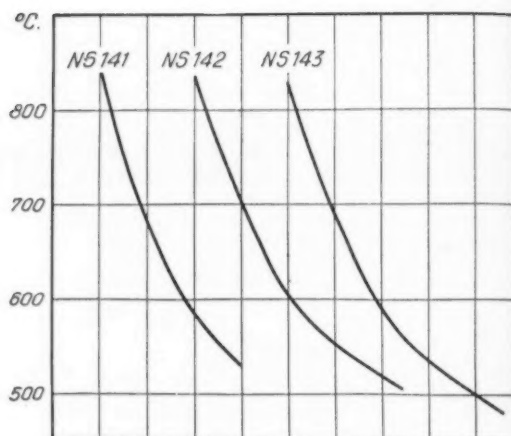


Fig. 26—Cooling curves of steels heated to $\theta_{max} = 1035$ deg. C. and quenched at 525, 500 and 475 deg. C. respectively.

which the cooling times (850-350 deg. C.) averaged about 235 sec., is shown in Fig. 34. The cooling times of these samples varied from 205 sec. to 250 sec., but by superposing their curves,

their cooling rates above about 850 deg. C. were found to be practically identical. Information obtained from these and the original curves is given in Table VI.

erate (body-centered solid solution and iron carbide).

This precipitation (shower precipitation) of body-centered solid solution in the form of plates or blades apparently continues with fall of temperature, because, other things being equal, the martensitic structure in quenched samples which had been cooled under the conditions described was reduced in quantity as the temperature of quenching was lowered.

It appears, then, that at some point slightly below 475 deg. C., the face-centered solid solution which remains unchanged in the interstices of the plates or blades of body-centered solid solution becomes saturated with carbon, etc., and transforms into an intimate mixture of body-centered solid solution and iron carbide.

Cooling Curves of Samples

It was found convenient to arrange the cooling curves in groups in accordance with their cooling times. Such an arrangement also facilitates discussion. Fig. 33 reproduces a group of six curves, representing samples of which the average cooling time was about 450 sec. While the cooling time of these samples varied from as little as 409 sec. to as much as 482 sec., yet superposition of any one curve on another, both being chosen at random, showed that the rates of cooling of the samples at temperatures above 850 deg. C. were practically identical. From these and the original curves, the information given in Table V was obtained.

Another group of six curves, of

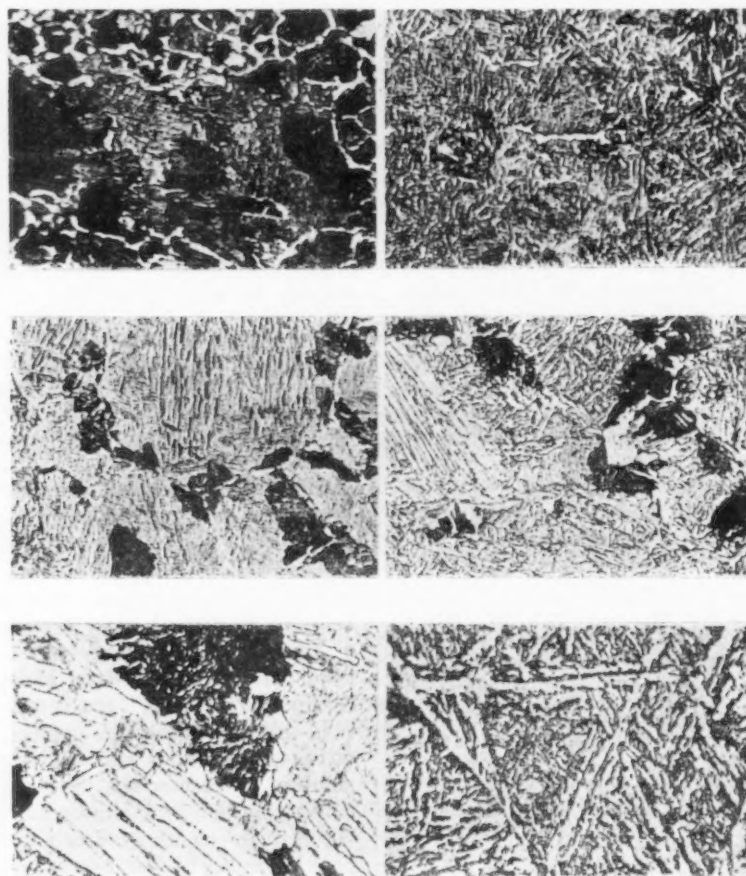
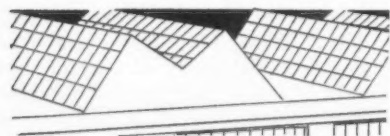


Fig. 27—(upper left) Structure of sample heated to 865 deg. C. (130 min.) and cooled (850 to 350 deg. C.) in 185 sec. Fig. 28 (upper right) Structure of sample heated to 1035 deg. C., then cooled to 650 deg. (850 to 350 deg.) in 350 sec. and quenched. Fig. 29 (middle left) Structure of sample heated to 1035 deg., then cooled to 575 deg. (850 to 350 deg.) in 375 sec. and quenched. Fig. 30 (middle right) Structure of sample heated to 1035 deg., then cooled to 500 deg. (850 to 350 deg.) in 400 sec. and quenched. Fig. 31 (lower left) Structure of sample heated to 1035 deg. C., then cooled to 500 deg. (850 to 350 deg.) in 400 sec. and quenched. Fig. 32 (lower right) Structure of sample heated to 1035 deg. C. and cooled to room temperature (850 to 350 deg.) in 350 sec. All photomicrographs etched in 5 per cent nital for 5 sec., 250 diameters except Fig. 31 which is 750 diameters.

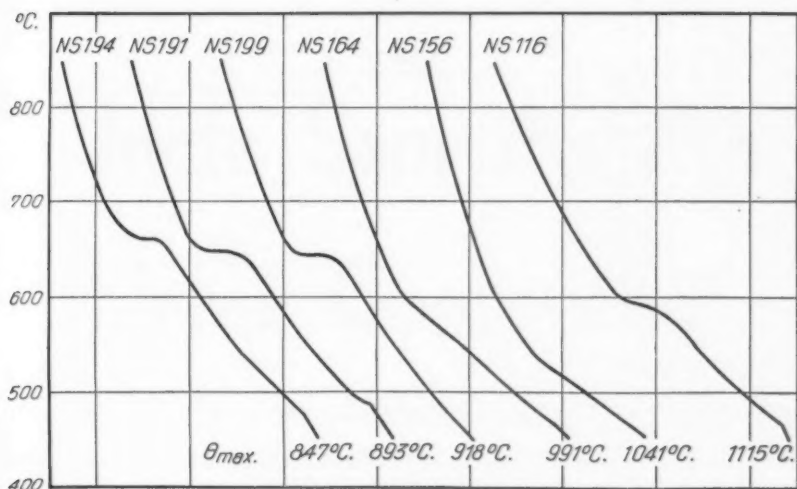


Fig. 33—Effect of θ_{max} on critical points of samples. Cooled (850 to 350 deg. C.) in 450 sec.

A last group of six curves is shown in Fig. 35. These refer to samples of which the average cooling time (850-350 deg. C.) was about 165 sec. The actual cooling times varied from 139 sec. to 182 sec. Information obtained from these and the original curves is given in Table VII.

Tables V, VI, and VII show that, no matter what the average time of cooling (850-350 deg. C.), as θ_{max} , or maximum temperature, is raised, the Ar_1 point is depressed. It was quite impossible to locate the Ar_1 points in these curves. An inflection at about 467 deg. C. characterized all the curves. This inflection undoubtedly coincided with the temperature at which a reaction, involving an evolution of heat within the sample, completed itself. The probable temperature at which this reaction starts, viz., 505 deg. C., could also be determined from the original curves. Frequently, however, it was difficult to decide on this temperature, probably because the Ar_1 point approached it closely.

To insure that the inversion at 467 deg. C. was due to changes occurring in the samples and not to a peculiarity in the behavior of the controller at the

point corresponding to this temperature, cooling curves were made of a sample of wrought iron which had been heated to and held at about 1000

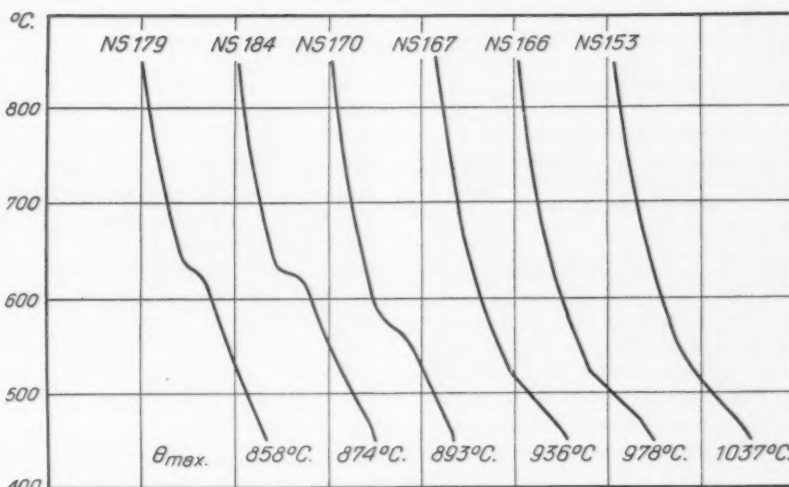


Fig. 34—Effect of θ_{max} on critical points of samples. Cooled (850 to 350 deg. C.) in 235 sec.

deg. C. for 15 min. These curves showed no signs whatever of an inversion.

Some reference should be made to the curves obtained from samples of which the cooling times (850-350 deg. C.) were less than 100 sec. Those obtained from samples N.S. 124 and N.S. 186 are typical and are reproduced in Fig. 36. When these curves were superposed, they were found to coincide almost exactly over the range 750-400 deg. C. In sample N.S. 124 the inversion, as determined from the original curve, occurred at 460 deg. C. The inversion is less distinct in the replotted curve for sample N.S. 186 than in that for sample N.S. 124. Both the original curves were smooth below the inversion temperatures.

For the former sample θ_{max} was 875 deg. C.; for the latter it was 1125 deg. C. The structure of the former was Widmanstätten only, while that of the latter was Widmanstätten with martensitic areas. Apparently, the heat evolved, due to the transformation of the solid solution of carbon, etc., in face-centered iron into a solid solution having tetragonal lattice with

consequent formation of a martensitic structure, did not affect the smoothness of the cooling curve for sample N.S. 124 below 460 deg. C.

It appears, then, that the inversion at 467 deg. C., which was so conspicuous a feature of the curves, is not only the temperature at which the interstitial face-centered solid solution, saturated because of the formation of the blades or plates of body-centered solution, transforms into the intimate mixture of solid solution of carbon, etc., in body-centered iron and iron carbide. It is also the temperature (Ar_1) to which, with high θ_{max} and fairly rapid cooling (850-350 deg. C. in about 85 sec.) part of the face-centered solid solution can be brought before it transforms into the tetragonal solid solution, the structure of which is martensitic. The Widmanstätten and martensitic structures are, in fact, so intimately associated in their modes, and temperatures of formation as almost to warrant the

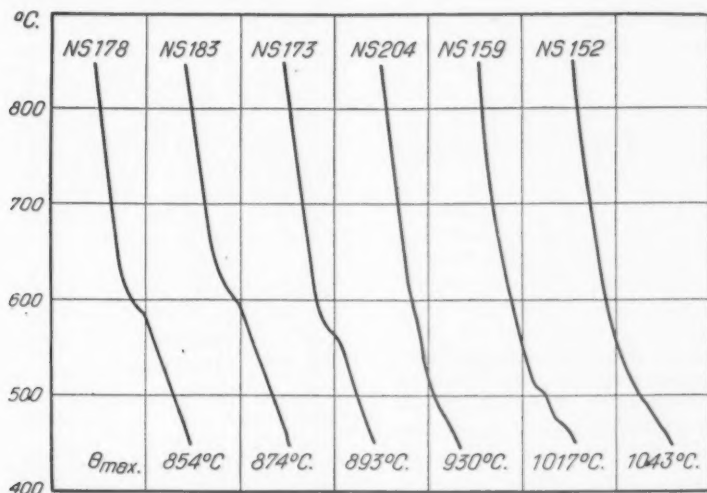


Fig. 35—Effect of θ_{max} on critical points of samples. Cooled (850 to 350 deg. C.) in 165 sec.

application of the term "incipient martensite" to the Widmanstatten structure.

Heating Effects Cooling Curves

Prolonging the time of heating at θ_{max} has little effect upon the position of the Ar₁ point, except in samples

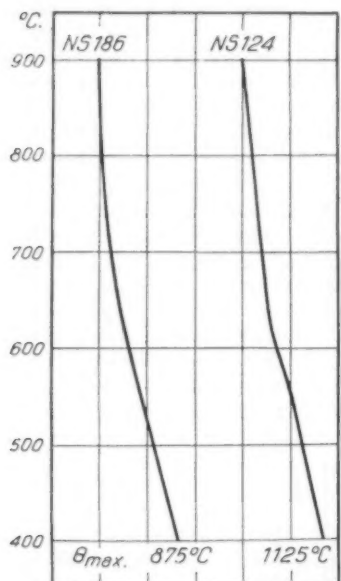


Fig. 36—Effect of θ_{max} on critical points of samples. Cooled (850 to 350 deg. C.) in less than 100 sec.

which, due to suitable heating, have undergone a marked change in grain size. For example, with θ_{max} at about 920 deg. C., the effect of time of heating was quite marked. In sample N.S. 198 (heated to and held at 919

deg. C. during 15 min. and cooled from 850 to 350 deg. C. in 478 sec.) the Ar₁ point was 648 deg. C. In sample N.S. 201, heated to and held at 920 deg. C. during 130 min. and cooled through the same range in 446 sec., Ar₁ occurred at 620 deg. C. Superposition of the cooling curves showed them to be practically coincident over the range 800-675 deg. C.

Table IV

Sample Number	Estimated Cooling Time (850-350 deg. C.)
N.S.144	350 ± sec.
N.S.145	350 ± sec.
N.S.146	350 ± sec.
N.S.147	300 ± sec.
N.S.136	* sec.
N.S.137	375 ± sec.
N.S.138	300 ± sec.
N.S.141	350 ± sec.
N.S.142	400 ± sec.
N.S.143	375 ± sec.

*Probably between 300 and 325 sec.

Table V

Sample Number	θ_{max} (°C.)	Ar ₁		Formation of Widmanstatten		Structure
		Beg. (°C.)	End (°C.)	Beg.† (°C.)	End† (°C.)	
N.S.194	847		660‡	524	475	Conglomerate
191	893		647‡	514	474	Conglomerate
199	918		645‡	507	472	Conglomerate
164	991	615	?	514	467	Conglomerate + Widmanstatten*
156	1041	605	?	507	451	Conglomerate + Widmanstatten*
116	1115	605	580	513	467	Conglomerate + Widmanstatten*

*Approximately equal amounts of the two structures.

†Values obtained from original curves.

‡Temperature of sample remained constant for a number of seconds.

Table VI

Sample Number	θ_{max} (°C.)	Ar ₁		Formation of Widmanstatten		Structure
		Beg. (°C.)	End (°C.)	Beg.† (°C.)	End† (°C.)	
N.S.179	858	635	620	507	470	Conglomerate
184	874	637	615	491	467	Conglomerate
170	893	587	?	507	467	Conglomerate
167	936	522	?	511	457	Widmanstatten + conglomerate*
166	978	520	?	514	472	Widmanstatten + conglomerate*
153	1037	545	?	497	477	Widmanstatten + conglomerate*

*Widmanstatten in excess.

†Values obtained from original curves.

Table VII

Sample Number	θ_{max} (°C.)	Ar ₁		Formation of Widmanstatten		Structure
		Beg. (°C.)	End (°C.)	Beg.† (°C.)	End† (°C.)	
N.S.178	854	610	585	514	477	Conglomerate
183	874	625	597	512	467	Conglomerate
173	893	620	590	?	455	Conglomerate + Widmanstatten*
204	930	...	...	496	460	Widmanstatten + conglomerate‡
159	1017	...	...	507	470	Widmanstatten + conglomerate‡
152	1043	...	...	510	460	Widmanstatten

*Conglomerate in excess.

†Values obtained from original curves.

‡Widmanstatten in excess.

A more striking instance of the effect of time at θ_{max} on the critical points of samples heated to and held at about the same temperature was afforded by samples N.S. 197 and N.S. 205. The former, which had a structure consisting of grains of conglomerate enclosed in ferritic network, had an Ar₁ point at 627 deg. C. (θ_{max} , 932 deg. C.; time of cooling, 298 sec.). In the cooling curve for the latter it was impossible to distinguish the Ar₁ point, but the 467 deg. C. inversion was clearly defined; the sample had a structure consisting of a definite excess of Widmanstatten (θ_{max} , 919 deg. C.; time of cooling, 300 sec.).

Apparently, the effect of time at θ_{max} was of importance only when marked grain growth resulted from increasing the time of heating at this temperature. Increasing the time of heating at θ_{max} , when θ_{max} was below about 1000 deg. C., resulted in marked grain growth at various centers throughout the samples. Since grain growth facilities the formation of the Widmanstatten structure, virtual obliteration of the Ar₁ point and intensification of the inversion at 467 deg. C. should result from prolonged heating where marked grain growth during the 115-min. period (130-15 min.) subsequent to the shorter heating time (15 min.).

In a subsequent issue the author will conclude his investigation with a discussion of current theory concerning the formation of various structures in steel, and, in addition, he will present a new constitutional diagram for quenched steels.

Uncle Sam As An Unfair Competitor

By GEORGE W. ALCOCK



THE National Industrial Recovery Act, familiarly known as NIRA, declares it to be the policy of Congress to remove obstructions to the free flow of commerce, to eliminate unfair competitive practices, to increase purchasing power, to improve standards of labor and otherwise to rehabilitate industry. The very basis of the National Recovery Administration's efforts is to introduce codes into every industry, governing trade practices, hours of work, wages, etc., and the speed with which industries all over the United States have cooperated with the President in the adoption of codes is a remarkable tribute to the confidence the people of the United States as a whole have in the New Deal.

On May 31, 1932, the Speaker of the House of Representatives appointed a committee of which the Hon. Joseph B. Shannon of Missouri was chairman, for the purpose of investigating Government competition with private enterprise, and all other questions in relation thereto that would aid the Congress in any necessary remedial legislation. This committee filed its report on February 8, 1933, and this report is now before Congress.

The first session of the 73rd Congress was a special one, convened by the President, and considered, therefore, only such legislation as was called to their attention by him to meet national emergencies. The Shannon report was, therefore, not a proper subject for study by Congress at this special session. It is, however, a very proper study for the next regular session, and the data developed by the Shannon Committee, and the specific recommendations which they made, are extremely interesting in connection with the intent of the National Recovery Act.

The extent to which the Government competes with private enterprise is almost beyond belief, more than 225 different trades, industries,

WHILE we are cleansing industry, through NRA, of unfair and harmful trade practices, why not complete the job by eliminating unfair Government competition?

Uncle Sam competes, unfairly, with many private industries. He figures his costs, too, on a basis that no accountant would tolerate in a private enterprise.

You will be interested in this timely article by Mr. Alcock, who tells us how and where the Government takes unfair advantage of private business.

and personal and professional services being affected by Government competition. The report cites only a few outstanding cases to show the depth of the resentment manifested by labor and business interests against the encroachment of Government competition, but the cases cited are sufficient to give cause for thought. Who had the temerity to make these protests? They were made by individuals, firms, partnerships, corporations, commercial and industrial associations and labor organizations, a veritable cross-section of the industrial and social life of the nation. A formidable array of witnesses, approximately 625, were heard by the committee, the hearings extending over a period of eight months. All sides were heard, and this is what the committee of the House of Representatives reported: that the evidence in general indicates that the operations of the Federal Government in the field of private enterprise have reached a magnitude and diversity which threatens to reduce private initiative, curtail the opportunities and infringe upon the earning powers of taxpaying undertakings while steadily increasing the levies upon them. In other words, the activ-

ities of the Government have reached a point where they are destroying the ability of the people to pay taxes, yet these very activities themselves increase the taxes.

The preamble states that the Constitution is to establish justice, increase domestic tranquility and promote the general welfare. The Constitution itself delegates certain specific powers to Congress, and in order that there may be no misunderstanding, the tenth amendment states that the powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively or to the people. It is difficult to find any warrant in the Constitution for the entry of the Government into what is properly private enterprise, and it is more difficult to find any justification for the extent to which it is competing with citizens in industrial undertakings. The Shannon Committee recognized this for, in their very admirable report, they call attention to the fact that the entrance of the Government into commercial and industrial undertakings, backed by public credit, for the purpose of competing with business establishments and the opportunities of livelihood of its citizens is, in general, repugnant to our fundamental democratic institutions and aspirations. No constitutional authority exists whatsoever which would permit the Government deliberately to engage in business in any form which competes with and impairs the private business of its citizens, except for reasons of economy, or fiscal or military expediency.

Government Costs Not Figured Fairly

Neglecting entirely the enterprises which might be considered necessary for governmental operation from the standpoint of fiscal or military expediency, and considering only those which are operated from the viewpoint of economy, does the Government se-

riously interfere with private endeavor? It is a notorious fact that in calculating costs all forms of governmental activity base their figures on the erroneous assumption that certain items which, in industrial accounting, must be considered in any cost compilation, do not enter into the cost of Government operation. These hidden costs, however, appear in departmental budgets and elsewhere, and are therefore a tax burden. If all essential and necessary items of cost are taken into account, it is generally admitted that Government operation is more expensive than private enterprise. The taxpayer, therefore, not only has to make up the difference between what is the actual cost, and what is considered by governmental bureaus as cost, but in addition he has to make up the loss in taxes due to the reduced earnings of private undertakings. This is the most pernicious part of the activity of government in the industrial field, and was fully gone into by the Shannon Committee, concerning which they said that if these hidden costs were brought to light many activities of the Government which are now justified on the basis of economy could no longer be defended.

The Army and Navy Transport Service is a good place to start, and it is well to keep in mind that the United States is the only major power operating its own transport service. The Shannon Committee report is very positive. It states that the transport service has not accomplished the purpose for which it was intended; that it is in direct competition with our own Merchant Marine; that the Merchant Marine enjoys a Government subsidy and pays taxes, while the transport service being a Government agency pays no taxes, and operates at a loss; that the facilities of the merchant marine are adequate to meet all the requirements of commerce; that officers are granted privileges in the use of the transport service which greatly increases the expense of operation; that the reasons advanced for the continuation of this service are to provide for an emergency, but that only one transport crossed the ocean during the World War, and it never came back; that the operation of the transport service should be discontinued as a matter of principle and economy, and that such action would stop a useless drain on the Treasury, remove competition from the merchant marine and provide a means of reducing the subsidy now granted to that service. The War Department estimated that the transport service saved \$10,000,000 per year, but when the figures were analyzed, and such items as depreciation, taxes, interest, supervision, etc., included, as would be done by any business man, a loss of \$3,000,000 a year instead of a profit was indicated. These are not rash statements—they are taken directly from the report of

a Congressional Committee. The loss is made up by the taxpayer who also makes up in taxes for the loss in Federal revenue on account of the shipping companies being unable to make a return to the Government through taxes on earned profits, due to their being deprived of the opportunity to handle business for which they are equipped.

The details of the transport service as told by witnesses is even more interesting. The facts must be true, as the hearings were public, and the statements were not refuted. The transport service is operated with two ports of call in the United States, San Francisco and New York. Personnel and freight to be transported must be shipped by rail to these two points. The expense of movement by transports is not compared with the expense of movement by rail, when troop movements are being considered, as the operation of transports is not considered as a cost, nor is the time or personnel wasted in circuitous journeys taken into account. Thus troops to be moved from Georgia to Texas, instead of being sent by rail direct, would be taken to New York by rail, thence by transport by way of Panama to San Francisco, and thence by rail back to Texas. Why? Because the rail cost is less than that way than from Georgia to Texas direct, and the cost of transport service is ignored. Hay purchased in the neighborhood of Seattle cannot be shipped to Honolulu or Manila by private ship lines. It goes to San Francisco by rail, and thence by army transport, even though the rail cost from Seattle to San Francisco is more than it would cost to ship the hay direct to destination by private ship lines. This is not the extravagant statements of shipping interest propaganda; it is the unrefuted testimony taken by a Congressional Committee.

What sort of a code of fair competition can the shipping and transportation companies work out which will protect them against the competition of governmental agencies such as the transport service?

Uncle Sam in the Garment Trade

Military or naval expediency might, by a far stretch of the imagination, be urged in favor of the Transport Service, but what can be said of the Government's entry into the clothing and shirt making industries? The fact remains that since 1927 the Navy has built up complete clothing factories, claiming that it could make clothing at its Brooklyn plant cheaper than it could secure it from private manufacturers. The Shannon report calls attention, however, to the fact that the Navy did not take into consideration any overhead allowance, nor did it figure on interest and depreciation on the plant. Furthermore, the Government pays no taxes, as is done by private enterprise.

Government bureaus use the manu-

facturing facilities of the various services to break down legitimate prices quoted by private concerns. It was shown at the hearing that the Army had set a price of \$2,800 on certain trucks; the lowest bid was \$4,000, so the Army purchased parts, assembled the trucks, and the taxpayers made up the difference.

One would hardly expect the Census Bureau to enter the manufacturing field, but they have been making tabulating machines for twenty-five years. Why? Because in 1907 the Director of the Census disagreed with the owner and inventor of the machine the Government had been using, and as a result of this disagreement he, the Director of the Census, obtained an appropriation and established a mechanical laboratory in the Bureau of Census, and the tabulating machines used by the Government have been made there ever since.

During the war the Government entered the paint and varnish field. This may have been necessary as a war time emergency. At the Shannon Committee hearings, however, the representatives of paint and varnish companies testified that the Navy is still in the paint and varnish business and that equipment for making varnish has recently been installed in the navy yards at Norfolk, Philadelphia and San Francisco. The Navy Department, not satisfied with making its own varnish and paint, enlarged its production capacity beyond its own requirements, and has entered into competition with private companies for other Government departments, with the result that several departments of the Government now place their orders direct with the Navy. Laundries, dry cleaning plants, leather shops, brick plants, broom plants, steel furniture, blue prints, 225 items of trade, industry and service affected by government competition.

Prison Labor Competes With Private Industry

We have heard much in recent months of the terrible spectre of Russian convict labor competing with the American workingman, breaking down fair price levels, and disrupting the standard of living of the American worker. The greatest peril, however, to the American workingman, strange as it may seem, is in our own Federal prisons. Men in prisons must be employed. With that there can be no valid objection. For the good of society men in prisons must be kept at manual labor, and the law covering prison labor has the approval of the American Federation of Labor. It is not the intent of the law, however, that prison labor shall be supplied with the latest type of labor saving machinery, or that prison made goods shall be put on a maximum production basis, but that is just what we are doing. The Federal prison at Atlanta operates a textile

(Concluded on Page 72)

Putting the Question Mark to Work

Annealing Saw Strip

We are having difficulty annealing and rolling a metal saw strip of the following analysis: Carbon 1.20 to 1.30 per cent, chromium 0.50, and tungsten 2.50 to 3.00. We would be pleased to have some suggestions as to annealing temperature and method of cold rolling, als as to a method of preventing decarbonization of the surface.

E. Bonner.

STRIP has been annealed successfully both by the pack anneal process and the continuous process, but the former is more generally used. The requirements are that the packing material exclude air from the containers and at the same time not remove carbon from the steel furnace. In order to accomplish the latter, the lowest possible temperature should be used, which will produce a strip of the physical character desired. Cast iron borings or turnings are the oldest and still the most common packing material.

Henry Disston & Sons, Inc.

IT is assumed that the hot rolled strip is practically free from decarbonization to begin with. If this strip after hot rolling is pickled free from scale and annealed in coil form in a tight box at a temperature of 1320 to 1340 deg., no trouble should be experienced either with decarburization or rolling.

It is important that the box of steel after heating to 1320 to 1340 deg. be flooded with some kind of carbon bearing gas, such as producer gas or the ordinary city gas. If the material is annealed in a lead pot the usual precautions must be observed to see that the lead bath itself is clean and deoxidized. We have rolled considerable material of a similar analysis and have not been troubled with decarburization if the first mentioned annealing procedure be used, but if this material is given any annealing while coated with scale, decarburization will be very excessive.

Simonds Saw & Steel Co.

WE suggest that this strip be annealed above the critical temperature, which is approximately 1600 deg. F., and cooled very slowly. To avoid decarburization it will be necessary either to pack anneal or to cool in a container in which gas is applied to keep out oxygen. In this latter case it would be necessary to keep the gas flowing until the strip is practically cool. Cold rolling of this material will be difficult because of its tendency to harden. Some cold working undoubtedly can be done by using

light drafts and by reannealing frequently.

Ludlum Steel Co.

WE have not had any recent firsthand experience in handling this material and there may be some developments with which we are not familiar. However, according to our information, annealing this steel preparatory for further cold rolling involves two main considerations: (1) securing suitable spheroidized condition of the carbides and (2) prevention of excessive decarburization. In order to satisfy the first requirement it is customary to air cool the material from fairly high temperature, generally in the vicinity of 1800 deg. F., and then to reheat it about 1475 deg. F. By using this combination of heatings, very long exposure to elevated temperature is avoided.

As for avoiding decarburization, it is best accomplished by heating under rather strongly oxidizing atmospheric condition. In spite of the apparent unsuitability of oxidizing atmosphere, the fact is that this is really good practice, for the steel appears to oxidize as a whole rather than to lose carbon by the separate oxidation of the carbon. At any rate the final results indicate that box annealing can be much more severely decarburizing than the employment of so-called "sharp atmosphere." This process is easily carried on continuously or may be done in open coils. Due allowance must be made for a significant loss in weight due to the scaling. The second heating at about 1475 deg. F. does not involve much risk of decarburization and can be done likewise under oxidizing conditions.

These general principles were in use both in this country and abroad some time ago and we believe good results can be achieved thereby, although there may be a special contrivance for maintaining a moderately carburizing atmosphere in special furnaces now, which would more positively control the surface carbon content.

U. S. Co.

Pipe Supports for Steam Line

We are running a long 10-in. wrought iron pipe line to carry steam at 250 lb. pressure and 100 deg. superheat. Can you inform us as to standard practice in the spacing of supports?

H. K. G.

IN figuring the number of supports it is necessary to consider the weight of the pipe, the weight of insulation, and the weight of the liquid to be conveyed. In conveying steam,

the spacing of supports must be such as to avoid any possibility of sag in the lines where pockets of water would collect. It is our practice to figure spacing of pipe supports on the assumption that the line is completely filled with water. In many places it is general practice to test pipe lines under hydrostatic pressure. The following table gives our established practice for steel pipe:

Pipe Support Spacings for Insulation from 1 to 3 in. Thick	
Size	No. of Supports per 100 ft.
4 in.	10
6 "	8
10 "	7
12 "	6
18 " (outside diameter)	6
24 " " "	6

American District Steam Co.

Protection of Forging Dies

Can you advise us of some way to protect the impression in a forging die from getting scaled and dirty through hardening? Such scaling often necessitates a lot of expensive subsequent lapping. The steel used is air-hardening and is heated to about 1900 deg. F.

Hackensack Specialty Mfg. Co.

WE feel that for a hardening temperature as high as 1900 deg. F. the best thing to do is to pack harden in standard pulverized carburizing material which has been burned out and used up.

Ludlum Steel Co.

We recommend a bath hardening in such material as lump charcoal or mica, but steels vary in their sensitivity to scaling and this factor should be considered also.

Heppenstall Co.

WE have found that surfaces of a finished die may be very well protected against scaling by heating the die in a carburizing box packed with spent carburizing compound, taking precautions in heating to have the duration of operation sufficient to insure thorough heating of the die contained in the pack. After heating, the die may be removed from the pack and allowed to cool in air.

Another method which we have found effective under certain conditions, particularly under lower temperatures, is that of coating the surfaces which are to be protected with a mixture of lampblack and alcohol. This mixture should have the consistency of paint and may be applied with a brush. Several commercial compounds are on the market for this same purpose.

J. C. L.

Getting Increased Production From S

SUBJECT to the ability to dispose of the output, every unit of a steel plant should be used to its utmost capacity in order to keep down the cost of production. The factors which control the rapidity of working, with its attending fuel economy, are:

- A.—Furnace design; fettling and repairing practice; heating control.
- B.—Charging and casting facilities.
- C.—Quality of raw materials and mechanical condition thereof.
- D.—Process and practice; chemical control.
- E.—Staff.

Furnace Fettling and Repairing

The continual interference with the working of a furnace by doing minor repairs to door arches, gas-port ends, back and front linings and blocks not only takes time that could be more usefully employed, but by cooling down the furnace delays the working and gradually ruins the brickwork on other parts—causing further delays.

By fettling the linings and door jambs each time after charging with a little magnesite/chrome-ore paste (which protects silica brick very well), the premature failure of the linings and door jambs is prevented. To do this successfully it is necessary that the linings should have some slope.

The fettling of gas-port back stoppings is a continuous and expensive item on many furnaces, and this again can be almost entirely prevented by a few water-cooled pipes built into the wall.

For large furnaces the fettling time can be cut down considerably by the use of the Blaw Knox fettling machine, which makes a good job of the back bank and fettles a considerable distance up the back lining. A sound job can be done with its aid in 10 to 15 min., including fettling the front bank by hand. The time taken when fettling wholly by hand was $\frac{3}{4}$ hr. as a minimum. Careful attention should always be given to the proper fettling of the end banks under the gas ports, as very little hills or hollows in this position can cause a large deflection to the flame.

The water required for cooling pur-

*Appleby Iron Co., Ltd., subsidiary of United Steel Co., Ltd., Scunthorpe, Lincolnshire, England. The author contributed to the September meeting of the Iron and Steel Institute at Sheffield a paper from which the accompanying notes have been taken.



poses on a 250 to 300-ton tilting furnace is as follows:

- Cooling pipes for gas port nose and back stopping, approx. 10 gal. per min. each, or approx. 250 gal. per furnace.
- Water-cooled door arches (average of run), approx. 25 gal. per min. each.
- Water-cooled doors, 6 gal. per min. each.

The furnace life without any repairs except to door arches and fettling is 35,000 to 43,000 tons. The gas-port back stoppings require less than one small repair per run on the average, and the number of door arches repaired does not average more than one per week for three furnaces. The burnt dolomite used amounts to 50 lb. per ton of ingots.

Bottom troubles and consequent delays are almost entirely avoided on these furnaces by the practice of not emptying from the commencement of a run to the end, unless a holiday week intervenes.

Wedge Bricks in Checkers

The examination of a checker chamber often—one might say, usually—reveals the fact that only part of the checkers are being used, and that the hot gases are short-circuiting or channelling through only part of the checkers. This is found consistently in checkers which are large in length and shallow in depth.

Recently, trials have been made with a type of filling that has given very promising results, namely, $9 \times 4\frac{1}{2} \times 3\frac{1}{2}$ -in. side wedge bricks, set at 9×9 -in. or 6×9 -in. centers fully staggered, and in one case 6×9 -in. centers straight through. This filling was tried in the hope of stopping this channelling of the waste gases and making use of the whole of the checkers. It has been tried on four furnaces, and is apparently successful in its operation. The wedge brick seems to split the gases without much resist-

ance in the staggered checker; it diverts it four ways down clear passes forming the corners of a prism and causes considerable turbulence. The draught required is less than with ordinary staggered checkers, and the furnaces so equipped are working at a draught of 0.8 to 0.9 in. water gage (Blaw Knox valves), and 1.1 in. water gage with butterfly and water-sealed valves. The temperature of the top air checkers is 1100 to 1200 deg. C., (2000 to 2200 deg. F.) and that of the mixed waste gases 550 to 600 deg. C.

The flame in the furnace is very good, and the outputs have improved since fitting these checkers.

The leakage of air into the checker chambers has been minimized considerably by careful pointing and the application of two or three coats of a cheap special tar preparation, which closes up the brick pores and cracks in the brickwork very well.

Insulating the Furnace

The insulation of the furnace structure seems an obvious way of conserving heat. A trial was made by insulating the ends of the roof of a furnace nearing the end of its campaign, and it was found impossible to prevent the roof from dripping inside and very rapidly melting away. The bottom of one furnace has been insulated with 2 in. of magnesia-asbestos brick underneath the magnesite brick and dolomite bottom. After this bottom had had over 37,000 tons of steel made upon it, it was thoroughly examined; some of the insulation was laid bare and was found to be in excellent condition. It has had a further 30,000 tons made on it up to date, and there is no trouble to report.

It was thought at first that the conservation of heat caused by the insulation might cause the bottom to wear away quickly, but after the first few weeks on a new rammed bottom careful inspection has shown this to be little, if any, different from the ordinary insulated bottom.

Controlling the Air-Gas Supply

The automatic control of the air-gas supply to the furnace is complicated by the dirty and tarry nature of the producer gas. While it may be impossible to make a scientific instrument to suit these conditions, yet a

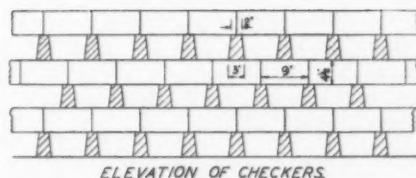
ona Steel Furnace

By ARTHUR ROBINSON*

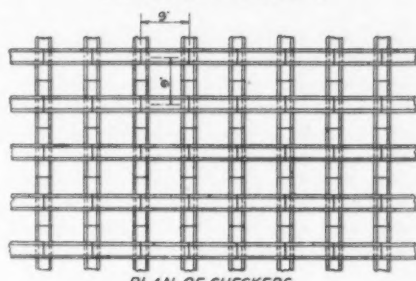
device has been in operation at the works for about two years which does the job more satisfactorily than the furnace operator. This consists of a simple arrangement of a cam on the shaft of the butterfly valve on the air-fan intake, worked by a wire rope from the up-and-down motion of the gas regulating valve. The shape of the cam (roughly part of a spiral) is such that the air is cut off rather more quickly than the gas, giving a very hot turbulent flame when required and a softer flame when the gas is eased. The gradual dirtying of the mains as the week progresses is compensated for by the gradual increase of pressure of the gas producers as required.

This simple apparatus is working successfully and giving excellent results. The operator cannot vary the air proportion. The total fuel used with three furnaces working over the last three months is 352 lb. per ton of ingots on the average, not including the heating-up of new furnaces.

The use of recording pyrometers to indicate the waste-gas and checker



ELEVATION OF CHECKERS.



PLAN OF CHECKERS

Wedge Bricks in Checker Chamber

temperatures, draught recorders, and air-quantity meters keeps a check on the operator's work and shows any unevenness in the furnace operation. Any obstruction or leakage which is

occurring in the furnace system can be detected by this means before it is too late to take steps to remedy the trouble.

Technical Men for Melters

The staffing of the furnaces is a matter that has not always received the attention it deserves. It takes far less time to train young men with a technical education to become melters; the result is much superior, and the cost is no more. The pay and prospects in a modern open-hearth shop are equal to anything offered in the engineering and electrical trades. The possibilities of better work are enormous, and the control and working of large modern furnaces making big outputs to rigid specifications makes the policy absolutely necessary. The mixing of this type of melter with the older men is wholly good, there having been no friction and a quickening of interest on the part of the older men in the structure of the furnace and the reasons underlying the instructions given to them.

Steel in European Highways

EUROPEAN steelmakers are making experiments in the construction and repair of highways with steel. Recent reports received by the Iron and Steel Division, Department of Commerce, reflect activities in this direction in Germany, Czechoslovakia and Poland.

A report from B. F. Post, American consul, Cologne, states that a section of street in Duesseldorf was recently paved with steel gratings. In August, according to a report from Sam E. Woods, assistant commercial attache at Prague, Czechoslovakia, the Vitkovice steel works began turning out steel ribs to be used in connection with resurfacing old or wornout roads. From C. Warkwick Perkins, consul at Warsaw, Poland, comes a report on completion of the initial phase of the first steel grid highway in Poland between Krolewska Huta and Katowice.

The pavement in Duesseldorf was laid with steel gratings, having a length of 6m. (19.68 ft.), a width of 1m. (39.37 in.) and weighing 180 kg. (397 lb.) each. They were delivered ready-made by the plant, to facilitate

the rapid laying of sections; a foundation of basalt gravel was used. The sections were solidly anchored to this base and either bolted or welded together. The depressions between the gratings were filled with macadamized tar, to insure a level surface that does not form waves or holes. Individual sections consist of zig-zag, high-edged



Roadbed in Czechoslovakia as the ribs were being covered with asphalt

bars running crosswise of the road and resting on a longitudinal wide base to which they are welded or bolted.

According to Professor Grunner, Graz, Germany, a running meter of a road, 6m. wide, can be paved with the steel gratings in 5 min. It is estimated that a highway of a width of 18m. (about 60 ft.) would require about 500 gross tons of steel per kilometer, or 800 tons per mile.

The costs as estimated by the Studiengesellschaft, under whose auspices the steel paving in Duesseldorf was carried out, are 8 to 9 marks per square meter, or about \$2 a square yard. On newly constructed roads this estimate may be lowered in comparison with medium weight construction.

The report from Prague, referring to steel ribs being made by the Vitkovice Iron & Steel Works for resurfacing old or wornout roads, says the ribs are welded together in sections. These are placed on the roadbed after all holes have been filled with gravel and sand or crushed stone and rolled. The steel ribs are 3/4 in. high and are covered with a 2-in. coating of asphalt and fine gravel.

Price Leveling Meets Three Big Obstacles

By FRANCIS JURASCHEK

It is a recognition of three factors, more than any obstinate adherence to out-worn theories of economics, which has caused so many manufacturers to disagree with any price-fixing proposals. They are not new factors, but present conditions have accentuated their importance. And until some wise leadership can figure out a reasonable way of leveling off the disadvantages caused to a majority of manufacturers by these factors, there will continue to be such wide divergences in selling prices as to make it increasingly difficult for many plants to continue operating.

These three factors are:

1. The lack of uniformity in cost accounting systems.
2. The lack of uniformity in management methods.
3. The lack of uniformity in equipment modernization.

Assuming for the moment that all other factors are equal (which is never quite true) and that disparities in cost due to plant location, transportation facilities, cost of power, availability of materials, labor conditions, shrewd purchasing advantages, inflated capital account values, excessive executive overhead, and a host of other diversified conditions may be excluded from consideration, these three fundamental factors make the cost of manufacturing a product in one plant vary from the cost of manufacturing it in another by as much as 50 per cent in a large number of cases; and in a few cases by as much as two to three hundred per cent. As a consequence, one manufacturer will be able to sell his goods at a profit at a price that is less than the cost of production for another manufacturer . . . and thus the problem of cut-throat competition abides with us still.

Perhaps it would be for the best interests of all in the long run that many who cannot make the grade should be allowed peacefully to die by the wayside. Which of us, however, today is competent to decide who should survive and who perish? It is at least the part of wisdom to give each his fair chance, particularly since the most pressing need of the moment is to get more men back to work instead of depriving anyone of present employment.

The basic problem is: How can costs be brought to fairly uniform lev-

els? Examine these three fundamental factors in detail:

Divergence of Methods in Cost Accounting

Perhaps nowhere in the whole domain of accounting are there such wide divergences of opinion as in what constitutes costs. It is quite a simple matter to determine such patent elements as cost of materials, cost of labor, cost of power, cost of equipment use, cost of packing and shipping, and similar items. But there are other factors entering into the final cost of a product which cannot be determined so infallibly. Some of these are amortization of capital account, depreciation of plant and equipment, sales and advertising expense and executive overhead. Here almost every accountant has a different idea . . . and it is only fair to remark that individual conditions vary so much that to secure uniformity of method is an Herculean task.

In one plant years and years of large profits have been plowed back into new building and new equipment, much of which is now idle. What part of this capital investment should be charged off, if any, to the costs of today's limited production? In another plant the investment account is comparatively small because the present owners bought it recently at a liquidation sale for a fraction of its actual cost. That investment amortization amounts to a considerably smaller unit charge to be added to actual production costs, particularly as this second plant is already operating at full capacity. What is a fair method of equalizing capital account amortization charges for both of these extreme instances, and for hundreds of in-between cases wherein the costs are materially affected?

An "How Old Is Ann" Problem

Depreciation of plant and equipment is a related part of this same problem that can be argued from now till doomsday. If a plant purchases power, the cost of power is a known quantity. If the plant makes its own power, it is unknown, for how quickly should depreciation write-off amortize a steam engine, a Diesel engine, a generator? Is ten years too

short, or forty years too long? Rate of use and type of work may wear out one pump in three months, while the same pump would give the most satisfactory service in another location for a generation. A machine tool may have an effective life of a decade, but if a new type is available that can cut the same operating cost by 40 per cent has it any real value at all now? The whole subject of obsolescence vs. apparent usefulness is discussed in greater detail below, but here the problem is, how long should the depreciation period be, to effect a uniform charge against production costs? Maintenance and repairs can be reduced to known unit values, but depreciation rate is susceptible of a score of interpretations.

Depreciation and Overhead Charges

And, unfortunately, the excess profits taxes levied on industry do not make the problem any simpler, for it is the natural tendency of all accountants to magnify depreciation charges in order to reduce these taxes. As a consequence, costs are often unduly loaded; and thousands of plants, with their physical equipment, are being amortized with undue haste. Eventually, of course, this will tend to reduce costs, but meanwhile it makes them higher than necessary.

Sales and advertising expenses, and executive overhead charges, are factors which acknowledge no such criterion as "standard." Nor does it seem possible to ever reduce them to any level of uniformity. Nevertheless, a variation of between 50 per cent and 500 per cent of production costs (these are conservative figures) ought somehow to yield to reason.

Differences in Cost Accounting Methods

Manifestly then, both internal business conditions and the variations of accounting opinion need to be coordinated to permit one manufacturer to overcome the disadvantages his particular accounting system imposes in comparison with another manufacturer, before he can meet the second man's selling prices and still make a profit.

Of any two manufacturing plants that may be considered, one is almost sure to be more efficient than the other. And, almost as inevitably, when the reasons are sought, they will be found in management. Until the plant which is at a disadvantage

with respect to its efficiency of management can be brought more closely to the level of the other, its costs, other factors being equal, will be higher. The study and application of the fundamental principles of management still has a big part to play in equalizing costs.

Obsolescence of Equipment

The statement was made last year by the Robertson Committee that a large part of the industrial equipment in American plants was obsolete or obsolescent. It would be strange if that were not so, considering the strides which mechanical and electrical engineering are making every day. It is probably essentially true that, every ten years at least, new and improved industrial equipment out-modes the old, by making possible quicker, better and less costly production.

It may be debated, of course, whether the needs of industry have prompted the designers and builders of equipment to burn the midnight kilowatt hunting for ways and means to improve their machines, or whether the machinery manufacturers are primarily responsible for the forward march of equipment design. The undeniable fact remains that equipment building is getting to be very like the automotive industry . . . a new model every year. This would be disastrous except for the other undeniable fact that there are always farsighted, progressive industrial executives to be found who are eager and willing to try out new ideas, and to scrap old methods instantly if the new proves better.

Thus there is ever an element in industry which gains a little advantage here and a little there over the conservative soul who is perfectly content to let a good means produce a good result . . . and the former, bit by bit attains lower costs while the latter dodgers on the level.

Blindness of vision as to replacement is not confined to the old-time, patriarchal executives whose hardening of the arteries is contemporaneous with a hardening of the purse-strings. It strangely affects young business men also . . . men whose excessive sense of caution over-balances their desire to stray even momentarily from the time-worn paths. Yet while they walk the same old treadmill with eyes fixed on the ground, their neighbors lift their gaze to a star . . . and chip another precious carbuncle off their costs by modernization methods.

Not New Problems

These are not new problems; they have been with us ever since the Industrial Revolution attained its majority. Increasingly, however, they have become more pressing, until now, with the NRA adding millions to costs

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COMPETITION, even under a code which stipulates no selling below cost, can be a cut-throat affair for the higher cost producers. Price leveling has been attained by the steel producing industry; with what success time will tell. But the great majority of metal-working plants, with diversified products and problems, cannot achieve this goal until three major obstacles are removed.

These obstacles are: variation in cost accounting methods, in management methods, and in equipment modernization. Public welfare and progress might be well served if these variations could be ironed out, even at the expense of the present superior strategical position of the low cost producer. But it is not likely to be accomplished during the term of the present recovery movement.

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by way of increased wages and shortened hours of work, they have become of vast importance. It may not be possible for many manufacturers, already hard-pressed and with practically exhausted reserves, to continue their haphazard, hit-or-miss methods, without taking the facts to heart, studying them conscientiously, and doing something quickly to correct the conditions under which they suffer.

For such manufacturers another phase of the National Industrial Recovery Act holds out a distinct ray of hope. It was not without good reason that the stringent limitations of the anti-trust laws would be softened to permit, and even encourage, the formation of manufacturers' associations in which a wholesome interchange of ideas can take place. Out of the pooling of thought which these associations will make possible must inevitably come a sensible, uniform system of cost accounting principles for each industry. That will be the first constructive result. Second, should come a general raising of the level of efficiency in management, brought about by an intensive study by each manufacturer of the management methods of his fellow members. And with this must come simultaneously a gradual replacement of obsolete or obsolescent equipment, as it is seen that improvements in management methods cannot be completely realized without a correspondingly thorough modernization of plant.

These are not problems to be put off until tomorrow; they must be faced today. Whether they be faced and solved by the industrial executive in

the confines of his own office, or be thrashed out stormily in conferences with his fellow men makes little difference, so they be bravely looked at and as bravely overcome . . . quickly and thoroughly.

Planning Committee On Foreign Trade

THE assumption by trade associations and chambers of commerce of a number of functions previously performed by the Bureau of Foreign and Domestic Commerce is to be arranged for by a national advisory committee on the foreign service representing foreign trade groups and chambers of commerce throughout the country, under the auspices of the newly formed Federation of Foreign Trade Associations.

Edward N. Hurley, who has been appointed by Secretary Roper as chairman of the Committee on the Foreign Service of the Business Advisory and Planning Council for the Department of Commerce, has authorized this Committee to undertake the work of setting up the organization to carry out important functions of the Bureau curtailed by the economy program.

Mr. Hurley's Advisory Board includes G. S. Bollensen of Chicago and E. P. Thomas, President of the National Foreign Trade Council; and the National Committee, for which G. H. Poudet of Baltimore will act as the Washington contact man, is composed as follows:

Neal Dow Becker, New York; James S. Carson, New York; Reginald F. Chutter, Philadelphia; P. M. Haight, New York; C. W. Linscheid, New York; R. A. Lundquist, Detroit; Clarence H. Matson, Los Angeles; Armand May, Atlanta; H. G. Moebus, Newport, Ky.; E. A. Parker, San Francisco; C. M. Peter, Towson, Md.; C. G. Pfeiffer, New York; General Palmer E. Pierce, New York; George P. Reinberg, Newark; Eugene A. Schwarz, Buffalo; Lawrence D. Seymour, New York; J. N. Spangler, St. Louis; C. J. Stilwell, Cleveland; Wallace Thompson, New York; C. M. Wynne, Chicago.

As an added incentive to the new committee's work, the National Foreign Trade Council reports that between July 1 and Oct. 1 our exports have already increased by more than 20 per cent over the corresponding months of last year.

The German Government has decided to industrialize East Prussia. Plans are already under consideration where the industrial worker will be allotted certain acreage in order that bare livelihood will always be assured.

Rail-Type Milling Machines Designed to Employ Carbide Cutters

THE Kearney & Trecker Corp., Milwaukee, is adding to its line a rail-type milling machine, features of which include unusual rigidity, smooth operation, versatility, and ease of control. This machine has been developed to use tungsten-carbide cutters to the utmost, but it can be furnished with optional speed ranges basically suited for other forms of cutting metals.

Construction is on the unit principle, the major assemblies consisting of a bed and table, two upright housings, a rail and tieplate which connects the upper ends of the two housings. The unit construction enables the machine to be made in three different widths and with various lengths of feeds. The smallest machine has a table 22 in. wide and the largest, a table 42 in. wide. The intermediate series has a table 30 in. wide. All three series can be furnished with either 7, 9, or 11 ft. of longitudinal table travel.

Four spindles, two of vertical type mounted on the cross rail, and two of horizontal type, one each on the two side housings, are regularly furnished. However, two horizontal and one vertical spindle, or two vertical and one horizontal spindle, or other combinations, may be selected to suit requirements. All spindles can be furnished either fixed or to swivel. If two vertical spindles of the swivel type are furnished, they may be swiveled 45 deg. toward each other, or 25 deg. away from each other.

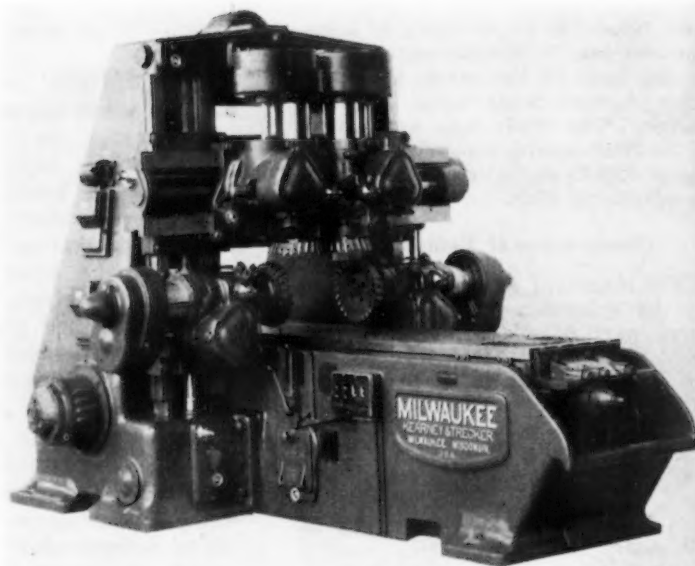
Each spindle is mounted in a 7-in. diameter quill and is provided with a quill adjustment of 7 in. Spindles are of alloy steel, heat-treated, hardened and ground, and are mounted on heavy-duty roller bearings.

Separate spindle speed-change gears, giving 10 changes of speed, and separate reverse gears, are furnished for each spindle, so that the speed and direction of rotation of each spindle are independent of any other spindle.

Any one of three spindle speed ranges can be furnished; 20 to 135 r.p.m. for use when cutting steel or cast iron with high-speed steel cutters; 50 to 350 r.p.m. recommended for milling cylinder blocks, crank-cases, and other cast-iron work of a similar nature, using tungsten-carbide cutters; and 75 to 500 r.p.m. for use when tungsten-carbide cutters are to be used for milling aluminum.

The drive from the pinion shaft to the spindle is through helical gears.

Speed ranges suited to all forms of cutting materials, including carbides, are furnished. Unit principle of construction is used.



The spindle gear of each spindle is mounted solidly on the spindle, whereas the driving pinion is splined. A heavy flywheel is carried on the spindle driving pinion shaft. These two factors, together with the heavy spindle, are intended to assure smooth, spindle drive.

Four motors, all controlled from a central panel at the side of the bed, are employed on the machine. For the small series machines a 20-hp. motor of the flange type furnishes power for all spindles, and a 5-hp. flange-type motor is provided for the table feed and power rapid traverse. Both motors are electrically interlocked when the control lever is in the feed position, and the feed motor will stop if the speed motor should stall. A third motor, mounted on the tie rail, furnishes power for raising or lowering the cross rail. A drum controller on the left-hand upright controls this motor. The fourth motor drives the centrifugal coolant pump.

The table can be furnished with either one of two feed ranges, each of which has 18 changes: 1 to 40 in. per min. is recommended when speed ranges of either 50 to 350 or 75 to 500 r.p.m. are used; and 1/2 to 20 in. per min. is recommended when spindle speeds of 20 to 135 r.p.m. are specified.

For all machines, the distance from the top of the table to the vertical spindle is 0 to 25 in., and from the top of the table to the center-line of the horizontal spindles is 0 to 19 in. Distance between housings is 32 in. for machines with 22-in. tables; 40 in. for machines with 30-in. tables; and 52 in. when 42-in. tables are furnished. The machine can be furnished with extended upright housings to increase by 6, 9, or 12 in. the maximum of 26 in. between the vertical spindle and the top of the table. All adjustments for the side and vertical heads are by hand. Equipped with four heads the machines range in weight from 28,000 to 42,000 lb., net.

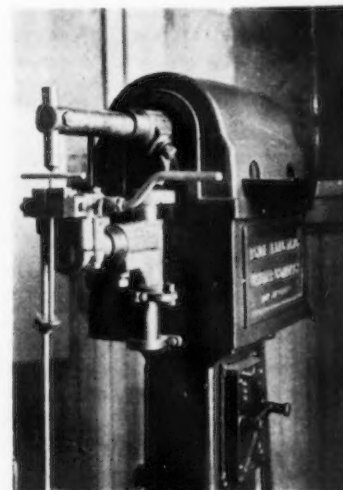
No. 1. This rail-type milling machine is designed on the unit principle of construction.

No. 2. Spindles can be furnished either fixed, or to swivel toward or away from each other.

Tee-Welding Attachment for Spot Welders

THE Acme Electric Welder Co., Huntington Park, Cal., has brought out a spot welder Tee-welding attachment for use in wire working and in the manufacture of refrigerator shelves, stove shelves and similar products. For Tee welding one of the attachments is mounted on the lower horn of the welding machine; for butt welding operations, two of the attachments, one on each horn, are employed.

The device is made of a tough bronze with solid reversible and replaceable die blocks. Pivot stud, cam, cam faceplate and other wearing parts are made of hardened steel. The jaws

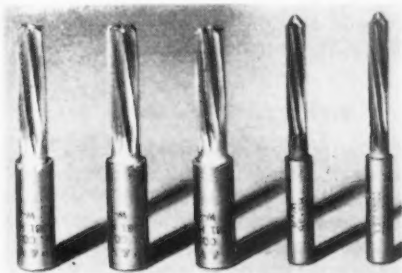


will accommodate wire from No. 16 gage up to $\frac{1}{2}$ in. in diameter, and may be adjusted quickly, by means of a thumb screw, to all sizes of wire within that range. The jaws are extra heavy and are actuated by a cam on the offset handle; they operate rapidly and provide for rigid clamping.

All parts are reversible, so that the attachment may be operated either right or left handed or upside down. An adjustable height stop is furnished, and the attachment is drilled and tapped to use side stop fixtures.

Stub Screw Machine Reamers In Decimal Sizes

NEW stub screw machine reamers designed primarily for automatic screw machine work and for reaming jobs requiring short tools have been placed on the market by the Pratt & Whitney Co., Hartford, Conn. These tools provide the decimal sizes necessary in accurate production where close fitting is needed. The decimal sizes are obtained by carrying the reamers in stock as standard blanks which are fluted, hardened and shank ground; these blanks are then finished to the required size to order.



The tools are made of high-speed steel, and are designed to assure free cutting. They are successful in drill presses, hand screw machines, some styles of tapping machines, and for reaming nut blanks. They are said to be particularly well adapted for use in floating holders. By using a pin through a hole in the shank a simple floating holder may be easily rigged.

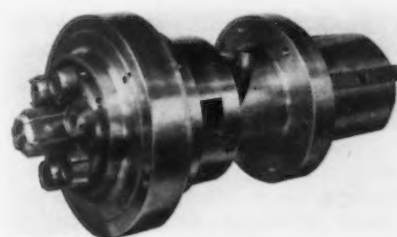
Fifteen sizes of blanks are stocked. Series No. 1 goes up to and includes 0.081 in., and series No. 15 covers the range from 0.4701 to 0.500 in. inclusive. The reamers in the first series have four flutes; all others have six flutes. All flutes are 7 deg. left-hand spiral. Overall length of reamers in series Nos. 1-9 is $2\frac{1}{4}$ in. with an effective cutting length of 1 in. The length of tools in series Nos. 10-15 is $2\frac{1}{2}$ in., with a cutting length of $1\frac{1}{4}$ in. Reamers in series Nos. 1-7 have 90 deg. external centers; the large sizes are ground off flat.

Circular Chaser Taps and Dies for Oil Field Casing Work

TO meet the trend toward higher accuracy in cutting taper threads on pipe and tubing, the National Acme Co., Cleveland, has developed a line of circular chaser receding taps and a series of expanding dies that also employ circular chasers. The taps



In the die head the chaser block is held firmly against a hardened ground gib, supported in the outer case of the die head. It is possible by replacing these gibs to change the die head for a different taper. An inside adjustable trip mechanism



The receding type collapsible tap is shown above and the expanding-type self-opening die head at the left.

range in size from 4 to 13% in. and the dies from 1 to 13% in. Larger sizes can be furnished on specification.

It is stated that the need of more accurate threads is particularly pronounced in oil field casing work where greater depth of wells has led to greater strain on the pipe joint and a higher liquid pressure, and where the necessity for economy has led to the repeated use of the tubing. A fine finish is necessary on the threaded surface, permitting repeated use without roughing up the surface.

The circular chaser, which resembles a circular forming tool, presents a large amount of steel back of the cutting edge, so as to carry away cutting heat and afford rigid support to the cutting edge. It is claimed that more threads can be cut for each grind of the chaser, and because the entire periphery of the chaser can be used without change in thread form, a great many more grinds are possible before throwing away the remnant of the chaser.

The chasers are ground on the form and mounted rigidly on a massive steel block, being inclined on the surface of the block in such a way that the successive chasers describe a perfect helix on the pipe. By means of a serrated bushing, on which the chasers are mounted, they can be advanced for grinding when the cutting edge is dull.

Since the chasers when sharpened are checked on a micrometer gage on the same blocks that support them in the die head, elaborate adjustments are eliminated. There is only one adjustment on the die head, and that is for pitch diameter. Chasers of a certain pitch may be used on a wide range of diameters.

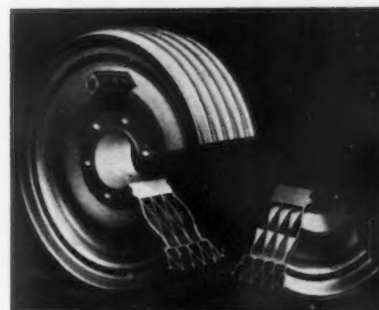
operating on ball bearings permits adjustment to proper length of threaded section. All parts of the die head are made of steel, ground to close tolerances, and all wearing parts are heat treated.

In the construction of the tap, each chaser block is held firmly against centre core piece, thereby establishing the taper that will be produced to very close limits.

Texsteel Texrope Drives Up to 15 Hp. Available

ALLIS-CHALMERS MFG. CO., Milwaukee, is offering Texrope V-belt drives, with one or both sheaves of Texsteel construction, in ratings from $\frac{1}{4}$ to 15 hp.

The Texsteel sheaves are of grid



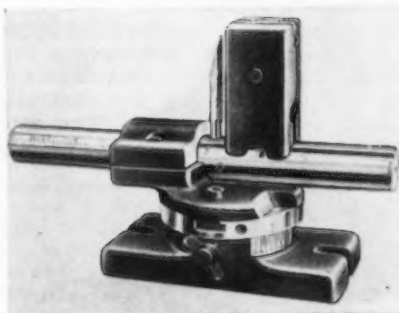
type construction, as illustrated, with accurately formed heavy-gage steel sections electrically welded at web and rim. Outer rims are rolled for protection, good appearance and strength. Integral bushings or solid bored hubs are standard. These sheaves are well balanced and are light in weight. They have an aluminum finish.

New Geometric Chaser Grinder and Universal Fixture

THE chaser grinder illustrated, recently brought out by the Geometric Tool Co., New Haven, Conn., will, with proper fixtures, sharpen any kind or make of die head or tap chaser, milled, tapped, circular or tangent, within its capacity. Because of its longitudinal, transverse and vertical travel, this machine, the No. 10, is also adapted for other tool grinding. An improved universal chaser grinding fixture, the type E, has also been introduced.

For grinding chasers the company recommends that the machine be equipped both with the style E universal grinding fixture and such chaser holders as may suit the Geometric chasers being used. This would obviate the necessity for equipping the machine with a magnetic chuck or chaser holders of the users' own make. The chaser holders, one for each size of chaser blanks, are mounted in the fixture; the chasers can then be swung under the grinding wheel for chamfer and face grinding to practically any angle and type of grind.

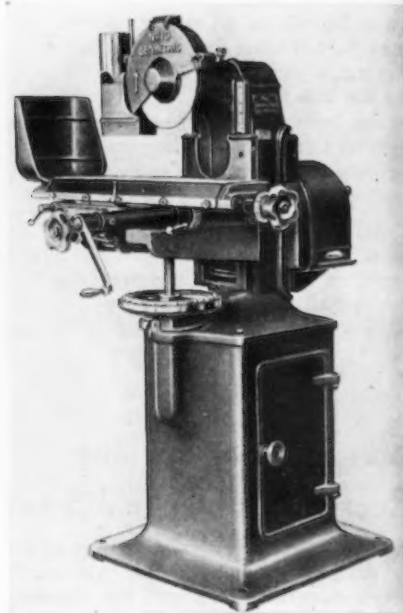
The spindle of the machine is heavy and rigid and is mounted in oversize ball bearings at both ends. All controls are accessible. Micrometer table adjustments for fine feeds and also scales to indicate diameter of wheel



Any kind of die head or tap chaser may be sharpened. The universal fixture (above) is of improved design.

and vertical table travel are provided. The spindle is entirely inclosed to keep out dust and dirt. Micrometer feed screw dials may be set to assure even grinding on all chasers of a set.

The style E fixture may be used in grinding chasers on both the chamfer and the cutting face. Milled chasers with a flat chamfer, tapped chasers with a concave chamfer, collapsing tap chasers with a convex chamfer may be rapidly ground, and right and left hand chasers may be sharpened with equal facility. The fixture can be used on any universal surface or similar grinding machine.



Improvements over the company's previous universal fixture include an additional plate that permits the fixture to be offset, thus giving the proper chamfer clearance for tapped (hobbed) die head chasers or collapsing tap chasers. This offset plate is equipped with opposing adjusting screws so that fine adjustment may be made and then the whole locked solidly in place. Another feature is the tongue and groove method of holding the holder on the fixture bar.

Laps for Finishing Cemented-Carbide Tools

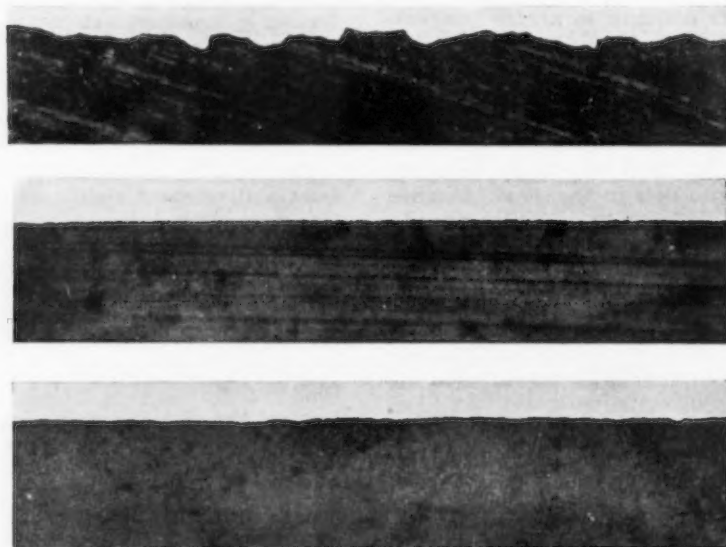
THOMAS PROSSER & SON, 15 Gold Street, New York, are representing A. C. Wickman, Ltd., Coventry, England, in connection with Spedia lapping wheels and hand laps for finishing all varieties of Widia and other cemented-carbide cutting tools. The wheels are said to quickly produce the fine finish obtainable heretofore only with a special cast-iron disk charged with diamond dust, and, furthermore, to eliminate the danger of chipping. Free cutting is a feature. The edge produced, as compared with the edge of an ordinary razor blade and the edge produced by the usual finish grinding wheel, may be seen in the illustration. The magnification is 210 X.

It is stated that ordinary finish grinding is suitable for much work on cast iron, etc., but for exceptionally fine finish, especially on non-ferrous materials, lapping of the cutting edge with the Spedia wheel will result in longer life, and higher production, as well as much better finish on the work. The wheels are stocked in cup form in standard size, namely, 3-in. diameter,

$\frac{7}{8}$ -in. deep, $\frac{1}{2}$ -in. hole, and $\frac{3}{8}$ -in. rim. They are operated at approximately 6000 ft. per min., and a thin oil of good quality should be applied to the face. Only very light pressure is necessary.

The Spedia hand lap is offered for

finishing new tools, such as Widia reamer blades, milling cutters and end mills, etc., and also for retouching tool set-ups in the machine, the latter resulting in longer life between grinds. Thin oil is also applied to the face of the hand laps.



The cutting edge of a Widia tool is shown in the center view. Above it is the edge of a similar tool, finished ground, and below it, the edge of an ordinary razor blade.

Rotary Shear for Straight and Curved Cutting of 3/4-In. Plate

A NEW rotary shearing machine designed to cut straight lines, circles, and irregular curves in 3/4-in. mild steel plate to the center of a 96 in. circle has been brought out by Williams, White & Co., Moline, Ill.

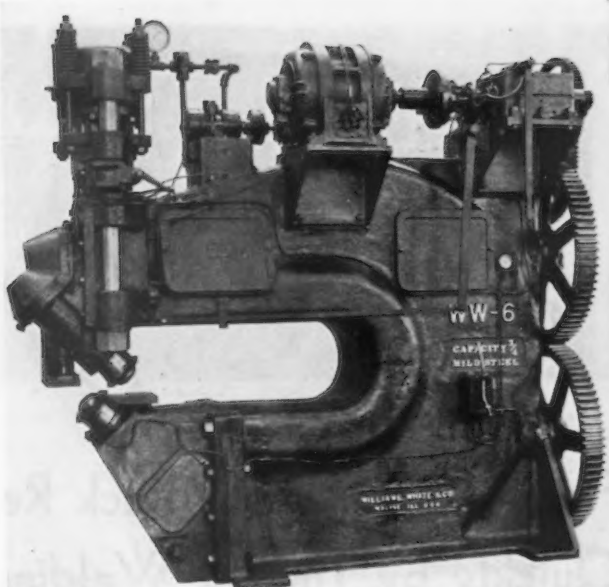
Cutters are driven by a motor mounted overhead, and the power is transmitted through cast-steel gears with cut teeth to drive shafts and chrome-nickel steel bevel gears and then to the cutter shafts. The upper cutter head is a one-piece casting with broad guides in the frame, and adjustment is provided for taking up wear. The head is moved downward and held by means of a hydraulic cylinder, the pressure for which is supplied by an individually driven rotary type pump. The ram of this cylinder is outside packed, and transmits pressure to the upper cutter head by means of a heavy crosshead supported on adjustable positive stops. This permits the cutters to be held under pressure at any point in their vertical adjustment.

For feeding the head down when cutting holes in the inside of a sheet or when flanging, the head is brought down to cutting position through the feed control valve. This hydraulic

Downward movement and holding of the cutter head is accomplished hydraulically. The system includes overload protection.

feed (patent applied for) is said to prevent overloading of the machine, as the pump will by-pass when the maximum safe load is exceeded, if too thick or too hard material is inserted between the cutters.

The lower cutter has longitudinal adjustment. Three speeds of cutting travel are provided by means of change gear box with gears running in oil. A friction clutch is placed between motor and gear box.



three-point suspension, and an automatic catch disengages the carriage from the worm drive when the end of the track is reached. Working parts are completely protected from dirt by a metal cover.

Linear speeds up to about 33 in. per min., depending on the gear ratio,

One-Piece Wheel for No. 16 Blanchard-Grinder

THE line of wheels and segments manufactured by the Blanchard Machine Co., Cambridge, Mass., for its surface grinders now includes the "sectored" wheel, here illustrated. This wheel is made in one-piece, and is said to have the desirable features of a segment wheel without its disadvantages. The fact that the wheel is mixed, molded, and baked, as a unit, is

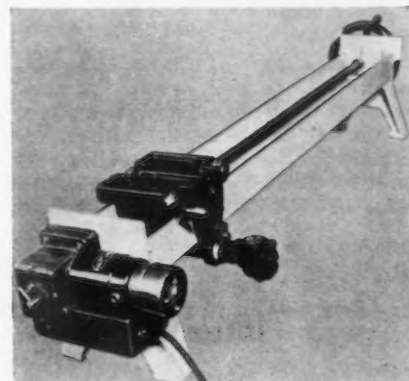
said to assure uniformity of grade throughout the wheel. The inner wall carries the water down to the face, and also gives a continuity to the wheel face that prevents pounding. The external notches do not collect dirt, they are shaped to equalize the work done by grains of abrasive at different circumferences. Tests show that this sectored wheel has ample strength for heavy duty. It is made in the 18 x 5 x 14 in. size, for use on No. 16 Blanchard grinder.



Oxweld Straight-Line Cutting Machine

THE Oxweld straight-line cutting machine, recently introduced by the Linde Air Products Co., 30 East Forty-second Street, New York, consists essentially of a steel channel supporting base, a means for moving the blowpipe, and adjustments for setting the blowpipe to cut bevels. Motion in two directions is possible: 45 in. longitudinally and 7 1/4 in. laterally. The machine can be furnished either with two traverse handwheels for hand operation, or with one hand-wheel and a universal motor, either of which can be used by simply throwing a lever.

The carriage is supported by a

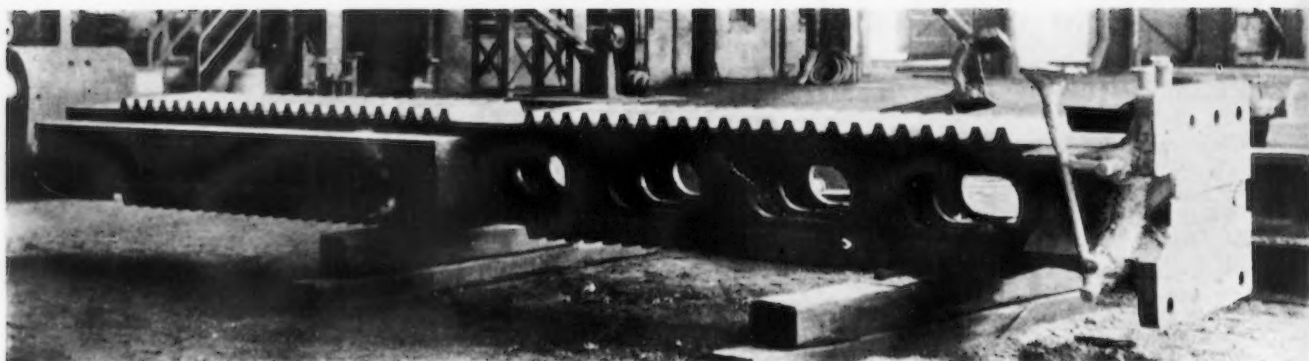


Straight and smooth cutting features this new Oxweld machine.

are obtainable. The machine has a governor graduated in inches per minute for setting the speed. A reverse switch permits motion in either direction. A straight, steady cut is said to be assured by roller springs that keep the gears in mesh and the carriage steady. The machine is light enough to be portable, but bolt-holes are provided for fastening it to a permanent support if this is desired.

It is stated that in trimming or beveling plate, clean, finished cuts are made with greater accuracy and speed than can be made by hand.

Interlake Iron Corp., reports a net loss of \$215,228 for the third quarter, after all charges, including depreciation amounting to \$250,822. This compares with net loss for the third quarter of 1932 of \$338,700.



Fractured Ball Press Rack Repaired Quickly by Thermit Welding

DURING the recent spurt in steel production, machinery and other mill equipment that had practically lain idle for two years was again put into service, and in some cases pushed to maximum capacity. Failures occurred, as in the ball mill rack here illustrated. As replacement of this broken part would have entailed costly delay, repair by Thermit welding was decided upon.

The rack, part of a large ball press in an Eastern mill, weighs 12 tons. Fracture occurred adjacent to a flange at one end of the rack. Although a difficult job for Thermit welding, because of the hollow box section of the rack, the repair was made quickly and

at a small fraction of the cost of a new rack. Six hundred pounds of forging Thermit were used. The illustrations show the weld before removal of the gates and risers.

The entire repair was made by the steel company's own men under the supervision of a representative of the Metal & Thermit Corp. Lining up the broken part on a bed plate, construction of the molds, reheating, and making of the welds were accomplished in three days. Furthermore, the welding is considered as fully restoring this machine member, the physical characteristics of the Thermit deposit being equal in every way to those of the parent metal.



The 12-ton ball press rack shown above fractured adjacent to the flange. By means of Thermit welding the piece was quickly restored and put back in service at a fraction of the cost of a new rack. The close-up view shows the weld with the risers and pouring gates still in place.

Introduces New Steel Beer Barrel

THE Geuder, Paeschke & Frey Co., Milwaukee, which for the past three years have manufactured a steel beer barrel for export, announce

a "Mammut"-lined steel barrel for domestic use.

This beer barrel, shown in the accompanying illustrations, is of electrically-welded, seamless construction with rounded corners and smooth surfaces, reinforced at the middle by extra thicknesses of steel. A feature is the use of Mammut lining, manufactured by A. Gusmer, Inc., and said to have been used in steel brewing vats and tanks for more than a quarter of a century. The exterior likewise is protected; it is hot galvanized after completion to prevent rusting, and can be enameled, lacquered, or aluminized if desired.

The bung construction, for which patent has been applied, is designed to prevent accidental loosening. When

the wood is driven into place, the four half moon cut-outs on the inner edge of the bung bushing allow the wood to swell enough to anchor it firmly. Bushings are made so that revenue stamps can be sealed on with the metal fastener.



The slotted bung and smooth lining of the Geuder, Paeschke & Frey steel beer barrel may be seen in the cut-away view at left. The outside of the barrel shown is hot galvanized.





THE NEWS OF THIS WEEK

British Market Improving, German Steel Producers Amalgamate

LONDON, ENGLAND, Oct. 31 (*By Cable*).—British pig iron production will be stepped up in November through the lighting of a reconditioned Cleveland furnace with a weekly capacity of 3000 tons. Pig iron demand continues firm, with overseas sales of hematite being made at 60s. per ton f.o.b.

Makers of semi-finished steel are becoming heavily sold, and demand for

finished steel also is broadening through export demand.

Tin plate prices are firm with demand moderate and continued expectation of a price rise due to more costly steel. Production and bookings are evenly balanced at 60 per cent of capacity.

Continental steel business is improving, with United Kingdom buying Continental semi-finished and finished material, orders coming from the Far East.

It is not now thought that the future of the Continental Steel Cartel in endangered by the impending secession of Forges de Clabecq, since the cartel is comprised of various national syndicates and the Belgian syndicate

is most likely to be solely affected by this resignation.

Japan has joined the International Tube Cartel. It has been granted an export quota and is bound by certain price agreements. These relate to gas pipe only and run for four years.

A significant German development which is taken as the prelude to a vast decentralization plan is the amalgamation of a number of German steel producers under the title of Vereinigte Stahlwerke. The capital of the consolidated companies is 560,000,000 marks. It is formed by the absorption, by Gelsenkirchener Bergwerks, of Vereinigte Stahlwerke, Phoenix Bergau und Huttenbetrieb, and Van der Zypen und Wissener Eisenhütten. This financial concentration is regarded as the first step toward the establishment of ten or twelve independent subcompanies, through which great economies and higher efficiency may be obtained.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton		
Ferromanganese, export	£9	
Billets, open-hearth	£5 5s.	to £5 12s. 6d.
Black sheets, Japanese specifications	£11	
Tin plate, per base box	17s.	to 17s. 6d.
Steel bars, open-hearth	£7 17½s.	to £8 7½s.
Beams, open-hearth	£7 7½s.	to £7 17½s.
Channels, open-hearth	£7 12½s.	to £8 2½s.
Angles, open-hearth	£7 7½s.	to £7 17½s.
Black sheets, No. 24 gage	£9 5s.	
Galvanized sheets, No. 24 gage	£11 5s.	to £11 15s.

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £ at \$4.86		
*Ingots	£2 5s.	
*Billets, Thomas	£2 7s.	
Wire rods, No. 5 B.W.G.	£4 10s.	
Black sheets, No. 31 gage, Japanese	£11 5s.	
*Steel bars, merchant	£3	
*Sheet bars	£2 8s.	
Plates, ¼ in. and up	£3 18s. 6d.	
*Plates, ⅞ in. and 5 mm.	£4 1s.	
*Sheets, ¼ in.	£4 6s.	
*Ship plates	£4 10s.	
*Beams, Thomas	£2 16s. 6d.	
*Angles (basis)	£3	
Hoops and strip steel over 6-in. base	£3 15s.	
Wire, plain, No. 8	£5 7s. 6d.	
Wire nails	£5 15s.	
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.	

*Prices as established by European Raw Steel Cartel.

Gain in Employment and Earnings in September

AFURTHER substantial increase, 6.8 per cent, in average hourly earnings in September, a slight advance, 1.1 per cent, in average weekly earnings, a reduction of 5.2 per cent in average hours of work per week, and an increase of 2.8 per cent in the number of persons employed are reported by the National Industrial Conference Board in its regular monthly industrial survey.

Average hourly earnings of all wage earners combined in the 25 manufacturing industries reporting to the Conference Board increased from 49.7c. in August to 53.1c. in September. The advance in average hourly earnings since the low point in June, when they were 45.2c., was 17.5 per cent. Average hours of work per week were reduced from 38.8 to 36.8 hr. Notwithstanding the reduction in hours of work per wage earner, average weekly earnings increased from \$19.25 to \$19.46. This increase, however, was more than offset by a rise of 1.3 per cent in living costs,

with the net result that real weekly earnings fell slightly, 0.2 per cent.

The increase of 2.8 per cent in the number of persons employed in these 25 industries was a smaller month-to-month rise than was observed in the previous month. The increase in employment together with the increase in actual weekly earnings made weekly payroll disbursements in September 3.9 per cent higher than in August. Total man-hours, however, fell off 2.5 per cent., indicating a slackening in business activity as compared with August.

Reynders to Advise in Structural Code

JOHAN V. W. REYNDERS has been invited by Edw. R. Stettinius, Jr., Washington representative of the Industrial Advisory Board, to serve as the board's adviser to the National Recovery Administration in connection with the preparation and hearings of the code of fair competition covering the structural steel and iron fabricating industry.

Bethlehem Earnings Reflect Better Output of Last Quarter; Current Rate 24%

OPERATING at 40.8 per cent of capacity during the third quarter, the Bethlehem Steel Corp. showed a net deficit of \$283,097, compared with a deficit of \$3,312,846 in the previous quarter and of \$5,425,724 in the third quarter of 1932.

Current operations were reported as 24 per cent of capacity, and Eugene G. Grace, president, said he was apprehensive of a further decline in business unless rail orders are placed. The early distribution of orders for 800,000 tons of rails, he declared, would keep mills busy for about four months. Annual purchases of rails for replacement purposes alone should exceed 2,000,000 tons, he said.

He attributed the recent falling off in steel business to the decline of activity in the automobile industry and to anticipatory buying by the trade in the third quarter and late in the second quarter when it became apparent that codification would raise steel costs. The code, he said, had increased Bethlehem's costs \$1,000,000

a month, figuring employment on the basis of the number of the payroll in August.

Mr. Grace looks for a gradual release of orders under the Government's public works program. A part of this program, the award of Naval work, accounted for most of the company's increase in unfilled orders over the previous quarter. The value of orders on hand Sept. 30 was \$72,155,458, compared with \$42,647,681 at the end of the second quarter. Navy orders received by Bethlehem totaled about \$28,000,000. The Naval work, however, will be spread out over the next year and a half or two years.

Operating income of the corporation in the third quarter was \$4,879,146, compared with \$1,669,559 in the previous quarter and an operating deficit of \$541,756 in the third quarter of 1932. Interest charges for the quarter amounted to \$1,688,534 and provision for depletion and depreciation \$3,473,709.

Exhibit at Purchasing Agents' Meeting

THE Purchasing Agents Association of New York will hold an exhibit of members' products at Hotel Pennsylvania, New York, Nov. 21. More than 60 companies represented in the association have taken space which has been offered free to members. The exhibit will open at 11 a. m. and will remain open until midnight. At seven in the evening a dinner-meeting will be held in the hotel.

Milwaukee R. R. Tests Ingersoll-Rand Diesel

TESTS of a new type of Diesel railroad engine developed by the Ingersoll-Rand Co., New York, have recently been made between Milwaukee and Chicago over the line of the Milwaukee Road. The engines developed speed comparable to that of the fastest passenger trains. Pulling two standard steel coaches, the engine developed a peak speed of 65 m.p.h., Milwaukee Road observers report. This performance is said to be better than that of any type of internal combustion locomotive tried out on the road. The engine, which burns low grade fuel oil, is powered with two Diesel units developing 800 hp. It has the appearance of a standard gas-electric unit. The power car contains

mail and baggage compartments. In regular use the engine would haul four standard steel coaches, and its makers predict that it will revolutionize railroading in services where longer trains are not necessary.

No Obligation to Deliver Steel by Truck

AN interpretation of Commercial Resolution No. 16 of the steel code, put out by the American Iron and Steel Institute under date of Oct. 26, makes it plain that there is no obligation on steel mills to deliver steel by truck to points of delivery not reached by railroads. In the resolution in question mills were instructed to add 50c. a ton to the delivered price in case a purchaser required delivery at a place within the switching limits of a city or a town which could not be reached by all-rail transportation, and to add \$1 a ton for such deliveries to places not located within metropolitan switching limits.

It is pointed out that these provisions do not add to the sellers' obligations but merely provide for the addition of certain minimum charges per ton where the shipper makes truck delivery at his own expense to a place not reached by railroads. If the purchaser provides trucks to transport a shipment from the seller's plant to a place of delivery not reached by a rail-

road, the provisions of Commercial Resolution No. 8, section 1, paragraph (e) apply, and the arbitrary charges provided in Commercial Resolution No. 16 need not be added to the delivered price otherwise chargeable.

Sheet Steel Business Met September Reverses

SALES, production and shipments of sheet steel products in September reflected declines, according to the report of the National Association of Flat Rolled Steel Manufacturers, Pittsburgh. According to the survey, which is based on figures covering a monthly capacity of 325,000 net tons, or approximately 59 per cent of the country's total capacity of 550,000 net tons, independent makers reported sales of 145,320 net tons in September, compared with 158,830 tons in August; production of 180,304 tons, against 203,893 tons, and shipments of 163,634 tons compared with 174,480 tons. Unfilled tonnage on Oct. 1 totaled 194,223 tons, or 59.8 per cent of capacity, compared with 212,879 tons, or 65.6 per cent of capacity in the preceding month. The September report with comparisons of the two preceding months, in net tons, follows:

	Sep- tember	August	July
Sales	145,320	158,830	174,191
Production	180,304	203,893	188,143
Shipments	163,634	174,480	174,145
Unfilled orders.....	194,223	212,879	228,696
Unshipped orders.....	61,566	64,583	62,720
Unsold stocks.....	53,617	51,293	42,095
Capacity per month...	550,000	550,000	550,000
Percentage reporting.	59.0	59.0	59.0

Percentages, Based on Capacity

Sales	44.8	48.9	53.7
Production	55.5	62.8	58.0
Shipments	50.4	53.8	53.7
Unfilled orders.....	59.8	65.6	70.5
Unshipped orders.....	19.0	19.9	19.3
Unsold stocks.....	16.5	15.8	13.0

Revision of Extras

THE American Iron and Steel Institute has decided to reprint those pages of the uniform extra book on which changes and corrections have been found necessary since the date of publication. Corrections for the first revision must be reported to the secretary not later than Nov. 13, in order to receive the consideration and approval of the board of directors. After that date no recommendations or changes can be given to the board prior to Dec. 31.

In the interim the extras as published in the extra book, under date of Sept. 20, must be strictly followed in quoting and billing all products covered.

W. A. Irvin Gets Ovation at Meeting of New Castle Tin Mill Workers

EMployees of the Shenango and New Castle works of the American Sheet & Tin Plate Co. and their families, some 4500 people in number, gave W. A. Irvin, president of the United States Steel Corp., an ovation at a social rally held in the cathedral, a large fraternal auditorium, in New Castle, Pa., on Oct. 21. Mr. Irvin, who was the guest of honor, delivered an address in which he stated that the United States Steel Corp. had been in the van of social justice.

"Long before the various States required industry to bear the burden of injury to its workmen, the Steel Corporation accepted that responsibility. Indeed, the workman's compensation law of your own State is modeled after the Corporation plan and was framed by one of the Corporation attorneys.

"The Corporation has long been in the lead in respect to pensions. Our employees who have grown old in the service of the Corporation have the security of a safe old age, one of the most comforting prizes that a man can win by labor."

Speaking on the subject of earnings he said, "You know that your

wages are always as high or higher than in other plants in a similar line of production, whose competition we have to meet. . . . You feel that your jobs are secure as long as there is work to do. You know that working conditions are always maintained at the highest standard."

Commenting on the excellent cooperation of the workers with the management in the interest of safety, he said that accidents in Steel Corporation plants have been reduced 88 1/3 per cent in 20 years. "Over one-half million accidents, with their attendant suffering, have been prevented in this campaign."

He solicited the same kind of collaboration for the employees' representation plan. "The success of the plan," he said, "requires the whole-hearted support of both the management and employees, and a sense of fairness and honesty on the part of the representatives of both. I can pledge you the whole-hearted support of the management."

Cooperation of this sort, he said, was the keynote of a movement which President Roosevelt has inaugurated to bring back prosperity.

Virgil Jordan, Head of Conference Board, Sees Danger in Recovery Trend

THE national recovery program is leading us irresistibly toward State socialism, declared Virgil Jordan, president of the National Industrial Conference Board, in an address at the annual dinner of the Metallurgical Advisory Board to the Carnegie Institute of Technology at Pittsburgh, Oct. 20.

"It was evident months ago, at the outset of the Administration's recovery program," he said, "that it would be compelled by the inevitable logic of events growing out of the forces of mass antagonism to industry which it recklessly let loose, to extend the area of control and make it constantly more detailed until it found itself forced to make large-scale investment in private enterprise, and to dictate salaries of individual executives in industry, business and finance. . . . When government undertakes to manage industry, it must manage all factors."

A lower standard of living will be the certain outcome of crippling individual initiative and enterprise through the control of bureaucratic agencies, he declared. "No nation can

raise its standard of living merely by raising prices through monetary manipulation or through curtailment of output and restriction of productive effort. Furthermore, the most important factor in the productive accomplishment of any people is the enterprise and effort of individuals, as investors, speculators, inventors, organizers, and managers. The incentive to economic effort has been and always will be the hope and desire for individual advancement and gain, until human nature itself is reconstructed."

Bethlehem's Exhibit at Ford Exposition

MODERN metallurgy applied to automotive manufacture is a feature of the exhibit of the Bethlehem Steel Co. at the Ford Exposition of Progress at Convention Hall, in Detroit, Oct. 21 to Nov. 4. The exhibit contains ladle test blocks for chemical analysis, a hot acid etch test on a 9 x 9 bloom, a test piece used

for determining tooth strength and various Ford parts made from Bethlehem alloy steels. In keeping with the historic spirit of the exposition, which shows 30 years of progress in making the Ford car, Bethlehem's exhibit contains a model of an 1871 Bessemer converter. The exhibit space is in a framework made from Bethlehem light sections, which are rolled primarily for residential and other moderate size building purposes.

C. E. Johansson to Speak at Pittsburgh

C. E. JOHANSSON, of C. E. Johansson, Inc., of Detroit and Sweden, and inventor of the Johansson gages, will discuss "Measuring a Millionth of an Inch" at the meeting of the Pittsburgh section of the Society of Automotive Engineers, Nov. 6, at the Pittsburgh Athletic Club.

Dr. Frank Jordan, director of Allegheny Observatory, will speak on the relation of accurate measurements to scientific research.

Metals Group Officers of Safety Council

IN connection with the recent congress in Chicago of the National Safety Council, the following officers were elected for the Metals Section:

General Chairman, E. F. Blank, Jones & Laughlin Steel Corp., Pittsburgh.
Vice-Chairmen, J. A. Voss, Republic Steel Corp., Youngstown, and H. W. Darr, Bethlehem Steel Co., Bethlehem, Pa.
Secretary, A. Berquist, Youngstown Sheet & Tube Co., East Chicago, Ind.
Committee Chairmen: Engineering, J. E. Culliney, Bethlehem Steel Co., Bethlehem, Pa.; Health, Dr. R. C. Engel, Corrigan, McKinney Steel Co., Cleveland; Membership, R. A. Chaffin, Continental Steel Corp., Kokomo, Ind.; Posters, W. D. Speight, Keystone Steel & Wire Co., Peoria, Ill.; Program, C. M. Allen, American Rolling Mill Co., Middletown, Ohio; Publicity, A. M. Lytle, Newton Steel Co., Monroe, Mich.; Statistics, C. E. Ralston, Pittsburgh Plate Glass Co., Pittsburgh; Slides and Safety Kinks, J. A. Oartel, Carnegie Steel Co., Pittsburgh; Foundry, F. G. Bennett, Buckeye Steel Castings Co., Columbus, Ohio; Railway Car Builders, P. J. Brand, Pullman Car & Mfg. Corp., Pullman, Chicago.

Members-at-Large: L. S. Adams, Hubbard Steel Foundry, East Chicago, Ind.; C. M. Allen, American Rolling Mill Co., Middletown, Ohio; J. A. Coltrin, National Radiator Corp., Johnstown, Pa.; H. M. Croghan, Inland Steel Co., Indiana Harbor, Ind.; G. A. Davis, Illinois Steel Co., Chicago; John P. Elb, Illinois Steel Co., Joliet, Ill.; E. A. Ellis, Wheeling Steel Corp., Wheeling, W. Va.; W. T. Filmer, Youngstown Sheet & Tube Co., Youngstown; A. C. Gibson, Spang, Chalfant & Co., Inc., Pittsburgh; Charles W. Hanko, Pittsburgh Steel Co., Monessen, Pa.; S. E. Hawkes, MacWhyte Co., Kenosha, Wis.; H. G. Hensel, Youngstown Sheet & Tube Co., Chicago; W. J. Ireland, Kohler Co., Kohler, Wis.; W. A. Jarvis, Chase Companies, Waterbury, Conn.; F. A. Lauer, Republic Steel Corp., South Chicago; T. H. McKenney, Illinois Steel Co., South Chicago; D. V. Medalie, Interlake Iron Corp., Chicago; W. E. Megraw, H. H. Robertson Co., Pittsburgh; Robert L. Schmitt, Louisville Car Wheel & Railway Supply Co., Louisville; J. K. Stafford, Mississippi Valley Structural Steel Co., Decatur, Ill.; J. M. Woltz, Youngstown Sheet & Tube Co., Youngstown.

G. E. Employment Up 7600 Since March 1

GENERAL ELECTRIC CO. has added 7600 employees to its payrolls since March 1, and the total annual payroll rate is today \$17,000,000 greater than it was on that date, Gerard Swope, president, made known today in a statement to the company's 187,000 stockholders mailed with regular dividend checks.

New business booked the first nine months of the year has shown a steady rise, and for the first time since 1929 orders have exceeded those for a like period of the previous year.

Another significant fact, Mr. Swope points out, is that this year, for the first time in three years, orders for the third quarter totaled more than the sales billed in the same period.

Unemployment Insurance Deadline in Wisconsin

INDUSTRIAL Commission of Wisconsin announced Oct. 20 that it has extended the deadline for the submission of voluntary unemployment insurance plans by Wisconsin employers to March 1, 1934. The 1931 Legislature enacted an unemployment insurance law which was to have become effective in 1933 unless employers put into operation their own programs covering at least 175,000 employees, but the 1933 Legislature postponed the operation of the act until business conditions improved and reduced the quota to 139,000 employees. Pointing out that employment was up 29.1 per cent in July, 31.8 in August and 35.5 in September, compared with employment for December, 1932, the Commission states that the required degree of improvement has now occurred.

Coke Production Rate Down in September

AFTER four months of increasing activity, the average daily production of coke as reported by U. S. Bureau of Mines, decreased 4.4 per cent in Sept., as compared with the year's high average of Aug. In contrast, the daily rate for pig iron decreased 14.2 per cent during the same period. The output of both beehive and byproduct coke for Sept. amounted to 2,771,550 tons, an average of 92,690 tons per day, as compared with a daily rate of 96,919 tons obtained during Aug.

The production of byproduct coke for the 30 days of Sept. was 2,712,050 tons, or 90,402 tons per day. In comparison with Aug., this was a decrease of 7.2 per cent in tonnage and 4.1 per cent in daily output. The decrease

was entirely at furnace plants, where the daily rate dropped 9.1 per cent; at merchant plants the rate advanced 6.8 per cent. Labor troubles in the coal industry in Pennsylvania were responsible for a decrease of 12.5 per cent in the production of beehive coke during Sept.

Stocks at byproduct plants increased slightly, from 2,915,388 tons at the close of Aug. to 2,984,797 tons at the end of Sept. The increase was principally at merchant plants. In terms of days' supply, stocks at the end of Sept. were equivalent to 33.0 days' production at the current rate, as compared with 30.9 days at the end of Aug.

Marked Activity In German Tin Plate

GERMAN tin plate production in August reached a figure never before attained even in prosperous years, according to advices from the American consulate general, Berlin, made public by the Commerce Department. Total output in that month amounted to 21,500 metric tons compared with 19,400 tons in July and 17,250 tons in June.

During the first eight months of 1933, production of tin plate in Germany amounted to 134,200 metric tons against 86,900 tons in the corresponding period of 1932.

The favorable development in the German tin plate industry is chiefly due to the increased export trade, which amounted to 80,600 metric tons in the eight-month period of the current year compared with 49,960 during the first eight months of 1932.

German tin plate, the report declares, is displacing the British product in many foreign markets. Domestic consumption has also considerably expanded as a result of larger demand by the automobile and can industries.

German tin plate manufacturers continue to use two and often three shifts, the report shows.

Pittsburgh Chapter For Used Machinery Dealers

THE Pittsburgh chapter of the Used Machinery and Equipment Dealers was organized at a meeting of local representatives of the trade on Oct. 12. William L. Moorhead, Jr., Moorhead-Reitmeyer Co., Inc., was elected president; Charles J. Lang, Lang Machinery Co., vice-president; M. D. Galbreath, Marr-Galbreath Machinery Co., secretary, and H. J. Roth, Reliance Machinery Sales Co., treasurer. Appointments to the executive committee included Charles J. Lang; John D. Crawbuck, John D. Crawbuck Co.; S. A. Myers, S. A. Myers Co., and F. C. McDonald, Pittsburgh Machinery & Equipment Co.

Pulmonary Silicosis, an Employment Problem

COMPULSORY insurance of employees by Massachusetts foundries has raised a rather perplexing question, especially in view of the aim of the NRA, because insurance companies until now have refused to insure certain workers claiming they are suffering from and inflicted with pulmonary silicosis, otherwise called sand on the lungs.

Under the Massachusetts laws foundry workers cannot be employed unless insured, and insurance companies not being willing to take a risk on sand lungers, employers had no alternative but to let the men go. In the case of a Taunton, Mass., stove manufacturer, 42 molders lost their jobs last April, and their cases have been under consideration by the State labor board and insurance commission since their discharge. There were many other cases where good molders lost their jobs.

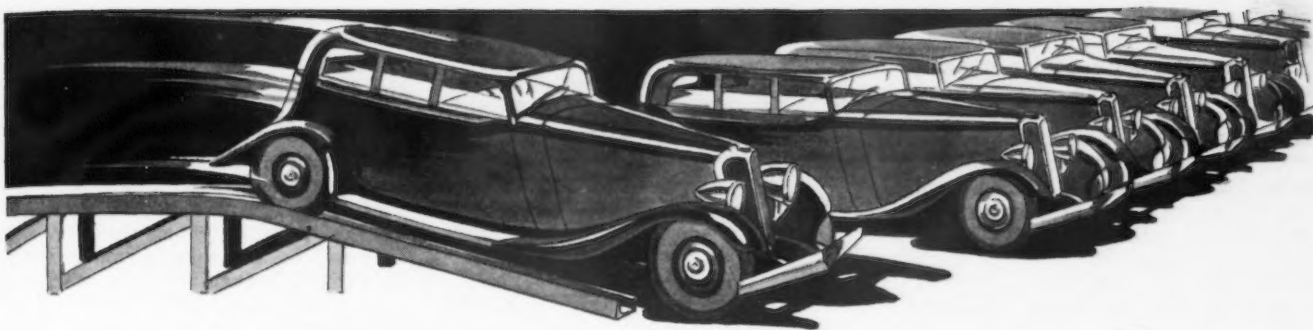
It is now said arrangements have been made whereby risks will be spread among several insurance companies. It is also said, that foundries in general will use some other material than the customary burnt sand for parting. Certain foundries have gone so far, where exceptionally good molders have been idle for months, to arrange for at least part compensation.

Correction of Commercial Resolution No. 13

THE American Iron and Steel Institute has republished Commercial Resolution No. 13, dealing with code prices governing lower Michigan steel consumers, in order to correct a typographical error in paragraph (g). As originally printed, paragraph (g) included cold-finished carbon steel bars among the products on which a deduction of 25c. a 100 lb. would be allowed to destinations in Michigan outside of Detroit to which all-rail rates from Pittsburgh do not exceed 29c. a 100 lb.

Paragraph (g) as corrected omits reference to cold-finished carbon steel bars, as this product is covered in the following paragraph, (h), which extends the deduction of 25c. a 100 lb. to destinations taking all-rail carload freight rates from Pittsburgh up to 31c. a 100 lb.

Steel Rolling Co., Jamaica, N. Y., recently organized by Mervin C. Polack, 87-15 167th Street, and associates, to manufacture steel products, has leased 8900 sq. ft. of floor space in a building at 601 West Twenty-sixth Street and will occupy for new plant. The company will specialize largely in steel tubing.



▲ ▲ ▲ THIS WEEK ON THE ASSEMBLY LINE ▲ ▲ ▲

Automobile Makers Laying Plans for Large Expansion in Sales in 1934

DETROIT, OCT. 31.

Plans being made by the automobile industry can be taken as an accurate gage of what lies ahead, next year will bring the country far nearer recovery than it is today. While the industry always has been optimistic, even in the face of the most depressing situations, it is gambling on the accuracy of its 1934 predictions by tooling up its plants for a much higher production rate than during the current year.

General Motors tentatively is counting on an over-all increase of about 35 per cent in sales and production. Apparently the sharpest gain is looked for in the low medium-price group, as Pontiac is said to be roughly figured as turning out 150,000 units, compared with 85,000 this year, and Oldsmobile 100,000 units, as against only 36,000 in 1933. Buick, which is running close to 50,000 units for the current year, is put down for 60,000 cars. Chevrolet has been conservative in estimating its expansion, having established a goal of 750,000 units, compared with approximately 625,000 the past year. It is notable that Chevrolet has made a practice of setting up relatively low estimates in the last few years and nearly always has exceeded them by a comfortable margin. No figures are available about Cadillac, but it is known that its program calls for more thorough blanketing of the quality car field.

Too much significance should not be attached to these figures, but they are valuable as a clue to the way in which General Motors is thinking for 1934. The total for the various divisions would give the corporation an output of slightly less than 1,100,000 cars. In connection with the high hopes for Pontiac, it is apparent that

this unit is to be more Chevrolet-ized than before. Its new general manager is H. J. Klingler, for the last four years vice-president in charge of sales of the Chevrolet company. The biggest gain of all divisions is being set for Oldsmobile, and if it can attain the objective of 100,000 cars during 1934 it will have a most spectacular rise. There is much talk about the new Olds being groomed as the style leader of the General Motors line, so far as concessions toward stream-lining and generally smart appearance are concerned. Olds will again have two cars, a six and an eight. It is understood that the six will be priced at a level which will assure it of a good share of the low medium-price business. Incidentally, it is whispered that there will be more over-lapping of prices in General Motors cars than in the past year. The decentralization policy, to which the corporation has committed itself, places the individual divisions more on their own and in keener competition with each other.

Optimism Prevails

The optimism of General Motors executives, as encouraging as it is, is mild compared with that of Chrysler Corp'n. The fact should be remembered that Chrysler is ending the current year flushed with success, having sold in the first nine months 122 per cent more cars than in the corresponding period of 1932. It is now predicting that 1934 will be a four-million-car year. It is tooling up its Plymouth plant to make 2500 cars a day and Dodge for 900. Based on production at capacity 160 days a year, Plymouth is putting itself in a position to turn out 400,000 cars and Dodge 144,000 in the next year.

The industry's optimism is not confined to General Motors and Chrysler. One prominent independent manufacturer is figuring on parts and materials on the basis of 50,000 and 100,000 lots for 1934. Its showing the past year would not justify such figures, as it evidently is anticipating a sharp rise in its sales. There is no way of finding out in what terms the Ford mind is thinking about the months ahead. However, despite the dramatic battle of words between General Johnson and the spokesmen for Mr. Ford over the NRA, the atmosphere at Dearborn is laden with cheer at the great success of Ford's Exposition of Progress at Convention Hall in this city. Almost 750,000 people visited the exposition during the first week, the show having been held over an extra week because of the unprecedented public interest in it.

With the manufacture of new models delayed by a combination of circumstances, including the tool and die makers' strike, the industry today is talking in terms of a car shortage after Jan. 1. The number of cars in dealers' hands at that time probably will be far less than either the factories or dealers earlier had hoped for. One of the important companies, which last year announced its new models early in December, just started the past week to pour a few cylinder block castings. It is doubtful whether its assemblies will get under way until Dec. 1 or later. This means public introduction of the car around the first of the year.

Because of the policy of restricting the number of models in their line and of holding production rigidly to retail orders, many manufacturers admit that they lost a considerable volume of business in 1933 which did

not go to any other maker. It represents postponed buying. The coming year these companies do not intend to make the same mistake. They are going to see that dealers are stocked more generously. This does not mean that they intend to indulge in wild gambling by producing a large number of cars on a chance that they will be sold, but rather that with buying expanding they must have more stocks in the field to meet their customers' wants, just as the retail store will have to carry more merchandise on its shelves.

One of the reasons why the industry feels that retail automobile buying will be good next spring is that the full benefits of the NRA, particularly of the public works program, will not be felt much before then. Both Federal and State governments will be heavy purchasers of cars and the million men who it is estimated will be given jobs on public projects will be prospective car buyers.

Tool Buying Slackens

Most of the machine tool buying in connection with new models is ended. Total expenditures by the entire industry were very lean and were confined to relatively few equipment builders. Most of the work consisted of rebuilding old equipment.

Automobile production is languishing and next month is expected to strike bottom for the year, with a rebound occurring in December. Chevrolet has cleaned up its 1933 run, and its plants are down pending the start of operations on the new car. The various Chrysler units will be idle during a considerable part of November while tooling up is in process. Plymouth made 21,000 cars and Dodge 9000 in October, according to the latest figures. Ford boosted output at Rouge from about 500 to 750 units a day, but it is believed that its October production was not over 25,000 units. Studebaker, with 8000 units assembled the past month, has a like schedule for November. Nash is busy on its new cars, which are to be announced on Nov. 7. Prices of its six-cylinder car will be \$40 higher; the advanced eight will run \$210 to \$255 higher, but the Ambassador eight will be down \$230. Twin ignition will be extended to Nash's entire line.

The first steel buying of consequence at new prices is expected late in November, but it is not likely to be large enough to create excitement. Not until the latter part of December are important steel orders looked for from the automobile industry. To illustrate to what extent the industry has gone in anticipating its needs, one prominent company has 25,000 to 30,000 tons of steel stored at the local Nicholson dock and probably will not move it into its plant for another 30 days. This company incidentally did not buy near the tonnage taken by one of its rivals.

▲ ▲ OBITUARY ▲ ▲

CHARLES F. ABBOTT, for the past 10 years executive director of the American Institute of Steel Construction, New York, died at the Doctors Hospital in that city on Oct. 27. He was born in 1876 at Concord, N. H. He began his business career as an office boy with the firm of J. A. & W.



C. F. ABBOTT

Bird & Co., Boston, in 1899. He remained with the company until 1909, holding successively the positions of salesman, branch manager and general sales manager. From 1910 to 1914 he served the Flintkote Mfg. Co. as general sales manager and resigned to become assistant general manager in charge of sales of the Art Metal Construction Co., Jamestown, N. Y. He came to New York in 1916 and was identified with the chemical industry as director of publicity and commercial research for the National Aniline & Chemical Co. until 1921. Mr. Abbott had great faith in the future of the steel industry and had been active in promoting the general use of steel in house construction. He was a member of a number of clubs and technical societies, including the American Society of Sales Executives, the New York Sales Managers Club, Engineers Club and the Chemists Club.

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HERBERT H. DEWEY, vice-president of the International General Electric Co., Inc., died at his home in Schenectady on Oct. 25, after a short illness. He was graduated from St. Lawrence University in 1904 and had been identified with the General Electric Co. since 1907.

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WILLIAM H. ABBOTT, for many years vice-president of Wheeling Steel Corp., died on Oct. 25 at the Ohio Valley General Hospital, Wheeling, W. Va. He was 58 years of age. One of the country's prominent steel executives, he had been associated with

the company or its predecessors for 35 years. Since the formation of the Wheeling Steel Corp. in 1920 through the merger of Whitaker-Glessner Co., of which he was vice-president, with the LaBelle Iron Works and Wheeling Steel & Iron Co., he had served on the board of directors of the corporation. In January, 1898, Mr. Abbott joined the Wheeling Corrugating Co. as a salesman at its New York branch. Shortly after becoming branch manager, he was made assistant secretary of the company at Wheeling. He later succeeded Alexander Glass as secretary when the latter became president, and was also made a vice-president of the Whitaker-Glessner Co. When the Wheeling Steel Corp. was organized, Mr. Abbott was made president of a newly formed subsidiary sales organization, Wheeling Steel Products Co. When the latter concern relinquished its charter to the Wheeling Steel Corp., he became vice-president in charge of sales of the corporation. During the World War, he was closely identified with operations of the War Industries Board, and in 1921 assisted in the framing of steel schedules for the Fordney-McCumber tariff bill. For many years he was on the executive committee of the National Association of Sheet and Tin Plate Manufacturers, and later with the Association of Flat Rolled Steel Manufacturers.

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WILLIAM MCCONWAY, JR., chairman of the board of McConway & Torley Corp., Pittsburgh, died on Oct. 16.

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WILLIAM A. MILES, for many years identified with the charcoal iron industry, died Oct. 24, en route to Florida, at the age of 83 years. He was manager of the Copake Iron Works, Copake Falls, Columbia County, N. Y., until 1898, when the furnace was leased by the Salisbury Carbonate Iron Co., from the estate of Frederick Miles. At the expiration of this lease Mr. Miles resumed management of the furnace for a few years. Built in



W. A. MILES

1872, the Copake furnace was owned by his father, Frederick Miles, who died in 1896. In addition to the furnace, which supplied iron for gun castings, car wheels, chilled rolls and malleable castings, the plant included an iron foundry and a chilled plow works. In 1930 the property was sold to the New York State Park Commission and the furnace, foundry and other units were razed. Mr. Miles held several patents, including one covering a pig iron casting machine. In 1888 he contributed an extensive article to THE

IRON AGE on the blowing engine installed at the Copake works.

FRED A. SMITH, oldest member and vice-president, Smith Mfg. Co., La-Crosse, Wis., died suddenly on Oct. 20, aged 77 years. He was born in Portage, Wis., and joined his father in the business in 1886. Mr. Smith was the second of five brothers operating the company to die this year. Burton C. Smith died suddenly in Chicago while on a business trip in July.

PERSONALS

W. E. LOY, from 1928 to 1933 president and general manager of the Ampco Twist Drill Co., Jackson, Mich., has been appointed general sales manager of the Union Twist Drill Co., Athol, Mass.

ARNOLD LENZ, general manager of the Chevrolet plants at Flint, Bay City and Saginaw, Mich., has received the honorary degree of doctor of engineering from the University of Aachen, Germany, for his contributions to the development of the foundry industry, especially in connection with high grade automobile castings.

ROCKWOOD N. BULLARD has resigned as western sales manager of the Detroit Steel Products Co. to become associated with the Goodwin Corp., Chicago.

EDWIN H. JONSON has been made manager of the contract division of the Gifford-Wood Co., New York.

A. V. GROVE has been transferred from Cleveland to the Chicago office of Steel & Tubes, Inc. R. E. DOYLE has been made sales correspondent and J. F. KEELER, sales engineer, with headquarters at Cleveland.

W. J. WOOLDRIDGE has resigned as manager of the electrical sheet department of the Empire Steel Corp., Mansfield, Ohio, to take a similar position with the Allegheny Steel Co., Brackenridge, Pa.

F. S. KIMMERLING has been appointed president and general manager of the AC Spark Plug Co., Flint, Mich., division of General Motors Corp. He has been associated for the past 16 years with the automobile accessory manufacturing business. With the exception of two war years, he was with the Remy Electric Co., Anderson, Ind., from 1916 to 1929, for seven years as production manager and for a year as assistant factory manager. In 1929 he was made president and general manager of the



W. E. LOY

Guide Lamp Corp., Anderson, Ind., a subsidiary of General Motors, holding this position until the beginning of this year when he became assistant at Detroit to C. E. Wilson, vice-president in charge of accessory manufacturing divisions of General Motors.

HARRY C. GOWRAN, vice-president and general manager, Hamilton Mfg. Co., Two Rivers, Wis., manufacturer of metal and wood printing and publishing house equipment, laboratory fixtures, etc., has been elected president, to succeed GEORGE S. HAMILTON, who has resigned to devote his time to interests outside the company.

G. N. HERMAN has resigned as western sales representative of the United Engineering & Foundry Co., Pittsburgh, to become vice-president in charge of sales for the Hubbard Steel Foundry Co., East Chicago, Ind.

EDWIN F. CONE, New York, will address the Philadelphia Foundrymen's Association on Nov. 8, at the Manufacturers' Club. His subject will be "Present Trends in Foundry Metallurgy, Ferrous and Non-Ferrous."

JOHN URQUHART has been appointed general superintendent of the Wood-

ward Iron Co., in charge of blast furnaces and coke works. For a number of years he was with the Semet Solvay Co., at Detroit and New York. A. H. MOORE, superintendent of the coke works, has resigned.

OTTO VON HALEM, representing steel advisory committees and steel industries of 10 European countries, extended greetings and best wishes for full success to the eleventh annual convention of the American Institute of Steel Construction, held Oct. 19-21 at Chicago. This message of good will was sent by Austria, Belgium, Great Britain, Hungary, Italy, Netherlands, Poland, Switzerland, Czechoslovakia and Germany. Mr. von Halem also extended greetings from his own organization, the Steelworks Syndicate, Duesseldorf, Germany.

H. B. RUST, heretofore president of the Koppers Co., Pittsburgh, has been made chairman of the board, succeeding C. D. MARSHALL, who has been elected chairman of the executive committee. W. F. RUST, vice-president, has become vice-chairman. JOHN T. TIERNEY, who has been associated with the Koppers interests for the past 17 years, has been elected president, and J. P. WILLIAMS, JR., vice-president. Mr. Tierney is a graduate of the University of Wisconsin and served his apprenticeship with the Laclede Gas Light Co., from which he resigned to become identified with the Koppers interests as superintendent of the Seaboard By-Product Coke plant. Mr. Williams attended the University of Virginia and spent a number of years in general mining work. He was first associated with the Koppers Co. as a mining engineer and manager of the Melcroft Coal Co.

NORMAN L. DANAY, who has been associated since May, 1932, with the Harris Seybold Potter Co., Cleveland, has been made general manager. He was at one time identified with the engineering department of the United States Steel Corp. For 18 years he served the Cooper-Bessemer Corp., Mount Vernon, Ohio, as engineer, production manager, treasurer and controller.

GEORGE W. ECKHARDT, for the past eight years sales manager of Henry Disston & Sons, Inc., effective Nov. 1, has joined the staff of George A. Fernley, secretary of the National Hardware Association, Philadelphia, to expand the service to members of the association in connection with code problems. THOMAS A. FERNLEY, JR., who joined the staff of the association in July, 1932, following his graduation from Princeton University, is spending a large part of his time in Washington keeping in touch with NRA developments.

P. W. A. Makes More Allotments for Projects

WASHINGTON, Oct. 31.—The Public Works Administration has allotted \$1,980,000 for the construction of a housing project in Cincinnati, which is to be made to a limited dividend corporation known as the Lanes Gardens Corp. Estimated total cost of the project is \$2,380,000, of which \$400,000 represents the equity of the corporation. The job will consist of three and four-story walk-up apartments, totaling 2120 rooms. Its construction will give employment directly to 910 men for eight months and considerable tonnages of steel will be required.

The P. W. A. has advanced \$1,000,000 to the State of Washington for the excavation and disposal of materials overlying the foundations of the Grand Coulee Dam project. This supplements a previous allotment of \$1,000,000 to finance construction of working quarters and facilities for engineers. The most recent advance

will permit construction to proceed at once under Federal supervision and will be repaid out of the original allotment when the authority is perfected and the original allotment transfer is made.

Non-Federal allotments to 23 projects amounting to \$1,055,237, have also been announced by Federal Administrator Ickes. Included in the list are sewers, waterworks, schools, roads, dams and public buildings. Most of the jobs are small, outstanding projects being a sewage system at Bristol, R. I., receiving \$200,000; a waterworks at Georgetown, Ill., \$140,000, and a water system at Grand Junction, Colo., \$100,000.

The Treasury Department has also been allotted \$19,000 for improvements to the State Department Building at Washington, including a tunnel to the White House and an underground garage.

of 527 over the numerical payroll in August of the 40 shops regularly reporting to the local branch of the National Metal Trades Association, W. J. Fairbairn, manager. The report mentions a "decided hesitancy" at this time but disclaims discouragement. Mr. Fairbairn maintains that "the line never goes straight up and there are bound to be recessions. He adds that there are questions to be answered, such as various angles of the NRA program and others, but he expresses confidence that the trend is definitely upward. The increase in men employed in the July-August period was about double that now reported for August-September, but it represents the sixth consecutive monthly increase. For several years before the trend turned upward in April, persistent decreases had been shown. The average number of hours worked per man per week fell from 36 in August to 34.7 in September. Taking the total number of employees in 36 shops for September, 1932, at 7622, as compared with 11,184 in the same shops in the same month of 1933, a significant and hopeful sign is observed by Mr. Fairbairn.

Steel Corporation in Quarterly Report Shows Marked Improvement

EARNINGS of the United States Steel Corporation for the quarter ended Sept. 30 amounted to \$11,816,832, compared with \$4,881,554 for the second quarter. After charges and allowances for depletion, depreciation and obsolescence (\$12,132,344) and interest charges for the quarter (\$1,278,504), also overhead expenses, largely taxes, of ore properties and Great Lakes transportation service (\$1,831,179), there was a deficit of \$3,425,195, which was reduced, however, by \$708,181 of special income to \$2,717,014. Again a distribution of $\frac{1}{2}$ per cent for the quarter on the preferred stock was voted, this amounting to \$1,801,405 and making the total deficit, to be provided from undivided surplus, \$4,518,419, compared with \$10,428,772, the total deficit for the second quarter.

Accompanying the quarterly statement, Chairman Myron C. Taylor issued the following statement:

Large Increase in Wages and Employment

Operations for the third quarter averaged 40 per cent of capacity of finished steel products for sale, compared with 27 $\frac{1}{2}$ per cent in the second quarter and 16 per cent in the first quarter. The income results for the third quarter accordingly show a decided improvement over those of the first and second quarters.

However, results for the quarter after deducting depletion, depreciation and fixed charges show a substantial deficit, amounting to \$2,717,014. The directors have again declared a dividend on the preferred stock of 50 cents per share.

Largely because of this increase in business a greater number of men were employed in the third quarter. Thus in September, 200,559 employees were given work, compared with 139,585 in March, an increase of 60,974, or 44 per cent. During the entire third quarter an average of 197,129 per month were employed, compared with a monthly average of 145,988 in the first quarter, an increase of 51,141, or 35 per cent. This increase in number of men employed, together with the fact that they worked a greater number of hours per week than in the first quarter, and by reason of the increases in wage rates effective July 15, resulted in a total pay roll for September of \$17,230,798, or 101 per cent greater than in month of March, 1933; and for the quarter ended Sept. 30 a total pay roll of \$54,483,150 compared with \$26,329,555 in the first quarter, an increase of \$28,153,595, or 107 per cent.

Milwaukee Reports Sept. Employment Gains

MILWAUKEE metal trades employment in September showed an increase from 11,872 to 12,399, a gain

Suggests Way to Form Waste Code Authority

BUFFALO, Oct. 17.—Acting under instructions from Deputy NRA Administrator Godfrey Bloch, Samuel Greenfield of Buffalo, president of the Western New York division of the National Association of Waste Material Dealers, has submitted to Washington the proposal of this body for the formation and administration of the code authority for the waste material trade.

Mr. Greenfield, who was designated by the Washington authorities to represent the smaller dealers in waste materials, was present at the meetings in the national capital the fore part of last week, at which time the scrap trade was unable to arrive at an agreement for the administration of the code for the satisfaction of all elements of the trade.

He suggests that 10 persons be selected from the various code committees of the three major waste material associations, under the heading of Waste Material Industrial Committee, and that these 10 persons select the names of 20 others, subject to the approval of the Administrator. These 20 persons shall be notified of their nomination and the trade in general be solicited through circulars, asking each to vote for five of the 20 persons nominated. The five receiving the highest number of votes shall be elected to serve on the Code Authority along with the original 10.



THIS WEEK IN WASHINGTON

NRA Approaches a Crucial Test

Expectation of Self-Government in Industry Dimmed by Evidences of Blundering and Bludgeoning Dictatorialness

By T. H. GERKEN
News Editor, The Iron Age

WASHINGTON, Oct. 31.—In less than a week after the various administrations had been spurred to renewed activity by the President's radio address on Oct. 22, the undercurrent of resentment toward and criticism of the entire recovery program has again become articulate. The Ford Motor Co. has been chosen as an offender and the Administration has threatened prosecution. The Federal Reserve Board has publicly accused the NRA and the AAA of being partially responsible for the recent decline in industrial activity. The National Labor Board continues to expand its activity through regional boards, but labor troubles have not abated. After a week in which the Administration had suggested to organized labor that it, as well as industry, might be whipped into line, the pendulum has swung back in the other direction. Section 7 (a) of the Recovery Act has been officially "clarified," and the so-called "merit clause" has been definitely ruled out of future codes.

The tool and die makers' strike at Detroit also remains unsettled. Notified by the strikers that their renewed negotiations, undertaken at the suggestion of the National Labor Board, had broken down, Chairman Wagner has announced that the case would now be taken up by the newly established Detroit Regional Labor Board. This board includes George Fink, president, National Steel Corp.; William J. McAneeny, of the Hudson Motor Car Co., and Charles D. Hastings, of the Hupp Motor Car Co. Its first major case will be watched with interest as a test of the recently introduced regional system.

General Johnson is now riding in a

Cadillac. The boys of the C. C. C. will likely go about their winter duties with the aid of something besides Fords. A Washington Ford dealer submitted the low bid on cars for the C. C. C. and gave the Administration its first opportunity to penalize those who don't fly the blue eagle by withholding Federal purchases. Although the automobile dealer in question operates under the NRA, the maker of his principal stock in trade doesn't. Perhaps some sort of official interpretation will be necessary.

Almost simultaneously with the Federal purchase incident, it was revealed that the Ford Motor Co. has not submitted statistical information to the National Automobile Chamber of Commerce, as administrator of the automotive code. Even though other major automobile companies have also failed to file this information because of the time required to collect the details, the Ford company's action has been severely criticized by NRA officials. A deadline for the submission of this information will probably be set early in November and if the Ford organization chooses to withhold its figures, an excellent test of the powers of the NRA will be offered. General Johnson signified his intention of following through in saying "I have no intention of entering into a newspaper discussion with a Mr. Cameron. Mr. Edsel Ford told me that the Ford Motor Co. would submit to no code that required collective bargaining. I have never said that I have concrete evidence of direct violation of the au-

tomobile code by that company. What I did say was that the moment I did have such evidence I would not hesitate to act."

Industry Not Slowing Up?

THE charge by the Federal Reserve Board that processing taxes and codes have been slowing up industry is illustrative of the friction between the various Washington administrations which are presumably working toward the same goal. A single paragraph in the *Federal Reserve Bulletin* brought the argument into the open. "The decline in industrial activity during the last two months," it read, "has come, in a large measure, in the industries in which expansion previously had been most rapid. It has been marked in industries in which processing taxes or codes have become effective recently." The offending statement was almost immediately characterized as "inadvertent."

General Johnson replied as follows: "Practically every major industry has been operating under a code since last August. Those not under codes have been operating under Presidential re-employment agreements in which the provisions were usually much stricter than the codes. And yet, with the exception of the steel industry, every report we have received from major industries shows a definite upward trend."

Secretary Wallace, speaking for the Agricultural Adjustment Administration, made no defense of the processing taxes in this case, merely admitting that he had predicted a temporary slowing up in the industries affected.

While it is well understood that the Federal Reserve Board has not been

in sympathy with certain aspects of the New Deal, lack of cooperation between its three major agencies, the PWA, the AAA and the NRA is noticed in some instances. The agricultural unrest in the West is said to arise not from activities of the NRA in boosting prices, but from the failure of the AAA and the PWA to make themselves felt in the affected areas. The NRA has naturally been able to move faster than its sister organizations, but it is readily understood that lack of coordination might easily hamper the effectiveness of the entire program.

The approach of winter has stimulated Federal activity generally but the prospect of much larger requirements for direct relief than were at first believed necessary is bringing grave concern. Growing unrest on the part of labor, which has been largely absent in the three previous depression winters, is now a dangerous factor. Many large corporations have also conducted individual relief work among their employees over the past three years which they may not now be able to do because of increased costs of operation under the NRA. They may also be expected to be much less sympathetic to employees who have been quick to strike and make excessive demands.

It is now rather evident that the public works program will not have progressed sufficiently before the beginning of winter to provide much additional employment either on the jobs themselves or in plants turning out supplies. Secretary Ickes is known to favor additional appropriations for public works amounting to \$1,700,000,000 and bringing the total funds for that purpose up to five billion. If expended at a time of increasing industrial activity, this would be extremely effective, but even this large sum represents such a small part of the normal national income that the backing of general business activity must accompany permanent recovery.

Foundry Equipment and Gray Iron Code Hearings

THE code of fair competition for the foundry equipment manufacturing industry will be presented for public hearing at the Carlton Hotel, Washington, at 10 o'clock, on Nov. 10, before Division Administrator Malcolm Muir. The Foundry Equipment Manufacturers' Association, which has prepared the code, represents 90 per cent of the industry.

The Gray Iron Founders Society, Inc., will submit a code of fair competition for the industry it represents at public hearing at the Carlton Hotel, Washington, at 10 a. m. on Nov. 9, before Deputy Administrator H. O. King. The association is said to represent 67 per cent of the industry.

Code Mill Speeded Up For Smaller Industries

WASHINGTON, Oct. 31.—Clarification by President Roosevelt of Section 7 (a) of the National Industrial Recovery Act, changes in the organization of the NRA to meet the problems involved in the administration and enforcement of codes of fair competition, and the setting up of an imports division in the NRA which is designed to control imports which are rendering ineffective or seriously endangering the maintenance of codes or agreements under the Recovery Act have been outstanding developments in the National Recovery Administration during the past week.

The President's interpretation of Section 7 (a) of the Act is of particular importance in view of the fact that it forbids the insertion of the so-called merit clause in any subsequent codes of fair competition. This clause, which appeared first in the automotive code, has been seriously criticized by labor. It is possible that any codes already approved which contain this clause may have to be revised. The President's interpretation of Section 7 (a) as contained in a letter to General Johnson follows:

"Because it is evident that the insertion of any interpretation of Section 7 (a) in a code of fair competition leads only to further controversy and confusion, no such interpretation should be incorporated in any code. While there is nothing in the provisions of Section 7 (a) to interfere with the bona fide exercise of the right of an employer to select, retain or advance employees on the basis of individual merit, Section 7 (a) does clearly prohibit the pretended exercise of this right by an employer simply as a device for compelling employees to refrain from exercising the rights of self-organization, designation of representatives and collective bargaining, which are guaranteed to all employees in said Section 7 (a).

Administrative Divisions Set Up

Adaptation of the NRA organization to meet the problems involved in administration and enforcement of codes of fair competition provides for the setting up of four divisions, each headed by a division administrator, for the four major classifications of industry to be responsible for the consideration of pending codes and the administration of approved codes. A compliance division as well as a national compliance board and a trade association division were also created.

The four industry divisions and the division administrators in charge and their duties will be:

Division 1—Extractive industries (metals, coal, automobiles, shipping and related industries).

Division Administrator—K. M. Simpson.

Deputy Administrators—W. H. Davis, Philip C. Kemp, K. J. Ammerman, L. H. Peebles.
Division 2—Construction and machinery, including lumber and metal products.
Division Administrator—Malcolm Muir.

Deputy Administrators—Tom Glasgow, H. O. King, Malcolm Pirnie.
Division 3—Chemicals, leather and other manufactures.

Division Administrator—Gen. C. C. Williams.

Deputy Administrators—R. B. Padlock, W. W. Pickard, R. S. Conkling.
Division 4—Trades and services, textiles and clothing.

Division Administrator—Arthur D. Whiteside.

Deputy Administrators—Dr. E. D. Howard, Dr. Lindsay Rogers, J. B. Dickey.

A special division for all amusement industries, under Deputy Sol Rosenblatt, will be attached for administrative purposes only to Division 4, but Mr. Rosenblatt will report directly to Administrator Johnson.

The assignment of deputy administrators to divisions, it is pointed out, is intended to conserve the General's time and to relieve him of much detail now to be left to division administrators. The grouping of deputies under division administrators does not diminish their responsibilities nor activities. Each division is to be a unit in itself with legal advisers, technical experts and industrial, labor and consumers' advisers permanently assigned to it by the legal department, the research and planning division and the three advisory boards respectively.

PENDING the appointment of a national compliance director who will serve not only as chief of the new compliance division but also as chairman of the national compliance board, General Johnson will act as director of the division, charged with the duty of adjusting complaints of violations of codes or President's reemployment agreements where possible. Cases which cannot be adjusted will be referred to the Federal Trade Commission or the Attorney-General.

The compliance division will prepare for and organize a regional code compliance system, pending the completion of which district managers of the Department of Commerce have been appointed, with the approval of Secretary Roper, to serve as district compliance directors.

The trade association division, created to prepare plans for and to advise the organization of industry for industrial self-government will be headed by Gen. T. S. Hammond.

Details of procedure under which the newly created imports division will

function to protect domestic industries operating under codes from harmful foreign competition have been made public by Administrator Johnson. In addition to the investigation of specific complaints filed by industries, the chief of the imports division, Oscar B. Ryder, is to be charged with the responsibility of constantly studying import statistics in order to assist the administrator "to determine whether any import which is substantial or increasing in ratio to domestic production shall be recommended to the President as a proper subject for further investigation on the President's own motion."

Likewise, the imports division chief is to attend, with the privilege of examining witnesses, hearings held by the Tariff Commission on order of the President under Section 3 (e) of the National Industrial Recovery Act.

Reports of the Tariff Commission of investigations under Section 3 (e) are to be referred to the imports division chief who will in turn transmit them to the administrator "with such comments and with such suggestions in regard to recommendation to the President as may appear to him best devised to execute the provision of Title I of the National Industrial Recovery Act."

All complaints received under Section 3 (e) shall be referred to the chief of the imports division, who shall determine if the complaint has complied with the provisions of Title I of the National Industrial Recovery Act by having signed an agreement or code pursuant thereto, and if the complaint is in the form and is supported by the information prescribed by the administrator.

The chief of the imports division may request of interested parties whatever information, sworn or unsworn, he may deem desirable in connection with any preliminary investigation or any complaint, and shall secure all pertinent information available in other Government agencies such as the Tariff Commission and the Department of Commerce. If interested parties refuse to supply any of

the information requested and if such information is deemed essential by him, the chief of the imports division shall recommend to the administrator that the information be required.

The chief of the imports division shall examine all the information obtained from any source in connection with any preliminary investigation or any complaint, shall make and submit to the administrator an analysis of the information obtained, and shall advise the administrator whether in his judgment the facts developed warrant further investigation, and if they appear to do so, to recommend to him the kind of investigation and public hearing which should be specified by the President.

Codes Approved

THE President has approved codes of fair competition for the following industries:

Plumbago Crucible
Steel Tubular and Fire Box
Boiler
Industrial Supplies and Distributors' Trade

Copies of any of these codes may be obtained from the superintendent of documents, Washington, for 5c. each.

Many Code Hearings Held

Hearings have been held during the week on the following codes of interest to the metal working industry: refractories; cooking and heating appliance makers; grinding wheel industry; all-metal insect screen industry; oxy-acetylene industry; machine tool and equipment distributors' trade; structural steel and iron fabricating industry; bolt, nut and rivet makers; motor fire apparatus manufacturers; cast-iron boiler and cast-iron radiator industry; anti-friction bearing industry, and the non-ferrous foundry industry on sub-codes for the aluminum permanent mold casting manufacturers' division, the blast furnace castings division, the sand casting division and the steel and rolling mill castings division.

Future Code Hearings

Hearings on many other important codes are scheduled over the next two weeks, having been tentatively set as follows:

Industrial Advisers Appointed

The following industrial advisers have been appointed by Edward R. Stettinius, Jr., liaison officers between the Industrial Advisory Board and the National Recovery Administration:

C. J. Ramsburg, vice-president, Koppers Co., Pittsburgh, for the structural steel and iron fabricating industry.

C. V. Hackman, formerly vice-president and general manager, United States Refractories Corp., for the refractories industry.

H. W. Holt, Bohn Aluminum & Brass Co., Detroit, and Dan Avey, editor of *Foundry*, Cleveland, for the non-ferrous foundry industry.

R. S. Hall, of Republic Steel Corp., as industrial adviser for the bolt, nut and rivet industry.

Pig Iron Output Off 14 Per Cent in October

ESTIMATED production of coke pig iron in October totaled 1,342,936 gross tons against 1,522,257 tons in September. The October daily rate, at 43,320 tons, showed a decrease of about 14 per cent from the September average of 50,742 tons a day. With returns in from almost all companies which were operating furnaces last month, there was a loss of 11 furnaces, or 78 in blast on Oct. 31, against 89 on Oct. 1.

(The usual tabulations and actual production will appear next week)

Pennsylvania Railroad, effective Oct. 16, reduced from four to two a month the number of furlough days without pay which its employees have been taking since July.

SCHEDULE OF CODE HEARINGS

Hearings	Number	Starting Date	Place	Deputy Administrator	Association
Special Tool, Die and Machine Shop Industry	215	11-2-33	Old H. O. Bldg., Caucus Room	Malcolm Muir	Special Tool, Die and Machine Shop Institute
Alloy Casting Industry	221	11-2-33	Raleigh Hotel, Small Ballroom	H. O. King	Alloy Casting Association, Inc.
Feldspar Industry	238	11-4-33	Willard Hotel, Willard Room	Malcolm Pirnie	Feldspar Association
Gasoline Pump Manufacturing Industry (Modification Proposal)	38-A	11-7-33	Dept. of Commerce, Rooms 2062-66	R. B. Paddock	Gasoline Pump Manufacturers
Gear Manufacturing Industry	240	11-8-33	Willard Hotel, Fairfax Room	Malcolm Muir	American Gear Manufacturing Association
Elevator Manufacturing Industry (Under Master Construction Code)	68-G	11-2-33	Mayflower Hotel, Jefferson Room	Malcolm Pirnie	National Elevator Manufacturing Industry

"No Strings on Replacement," Says Muir to Machine Tool Dealers

WASHINGTON Oct. 31.—Manufacturers of machinery need have no fears that their business will be impaired under the operations of the NRA by reason of any limitations imposed in codes to the use of machinery or the replacement of obsolete facilities by new equipment, according to the statement made by Deputy Administrator Malcolm Muir in an address to the Associated Machine Tool Dealers in convention at the Shoreham Hotel. Mr. Muir said there had been some confusion early in the administration of the Recovery Act upon this subject, but he gave the organization to understand that they need have no concern in the matter. In this connection Mr. Muir outlined the intent of the regulations.

"It is unfortunate," he said, "that in the confusing early days of NRA the idea was allowed to get abroad that no new machinery was to be bought by industry. Since then soberer analysis has shown that unless we have recovery in the heavy or durable goods industries, we shall have no real general recovery. To you and to me that of course is not news—we have known it from the beginning.

"In this connection many inquiries have come to me registering great concern with respect to the regulations limiting the purchase of productive equipment which were approved last week in the cotton textile code. There need be no concern. It is the logical following out of the spirit of the Act which, as I have said previously, is to give each industry the right to get rid of the abuses which have caused tremendous waste and profitless operations. In these regulations is registered the will of an industry which long has been burdened with too much producing capacity and which has kept that industry poor. The intent of the regulations is (1) to prevent unwarranted expansion of plant facilities and (2) to place absolutely no obstacle in the way of purchase of equipment for replacement purposes or to bring plants into balance.

"The manufacturers in that industry will find that they must purchase machinery for replacement purposes. The industry's equipment has deteriorated seriously during the last few years, as figures for machinery sales will strikingly reveal.

"The significance of this point to the manufacturer in the textile industry—and the same point applies to the

machine tool industry or the coal industry or any industry—rests in the fact that with wage chiseling restrained he now has a chance once more to secure a premium on efficient management, efficient methods and efficient plant. During the dreary years of cut-throat competition, while the pressure for lower costs was ever present, progressive management lived under the constant threat that any capital investment it might make in equipment to modernize production methods and so reduce costs could be wiped out over night by a competitor who posted a notice reducing wages. Under such a threat more than one company postponed the investment.

"I do not feel that you should be seriously concerned with the fact that in certain industries some intelligent control, based on a deep study of the facts, is placed on the expansion of facilities. In the case of the Textile Industry that control will lead to profitable operations which of necessity means that that great industry will again enter the market place for millions of dollars' worth of equipment and which it knows today it must have and has been unable to buy.

"Now that many industry codes have been accepted manufacturers with low cost plants are happy. They find they have many economic advantages.

"On the other hand, the high cost plant, if it refuses to see the advantage of using modern up-to-date machinery, continues to tolerate obsolescence, determines to retain high costs, virtually decides to commit commercial suicide. Now suppose you persuaded this plant to modernize, to install modern equipment and methods, to reduce costs to competitive levels. Then this plant could survive; then it could continue to provide employment and could continue to contribute to the economic and social welfare of its community. In addition, this plant would be helping to revive the prostrated industry of capital goods—would be doing its share of putting the 10,000,000 workers normally employed in the capital goods industry back to work."

E. A. Muller, King Machine Tool Co., Cincinnati, president of the National Machine Tool Builders' Association, congratulated the dealers upon their proposed code. The remaining sessions of the two-day meeting were devoted to final analysis of the various features of the code.

On the following day a proposed code of fair competition for the ma-

chine tool and equipment distributing trade was presented to the NRA at a formal hearing by William K. Stamets, Pittsburgh, president of the Associated Machine Tool Dealers. The proposed code provides for an average 40-hr. week, with 48 hours permitted three weeks out of every six months to take care of peak demands, and minimum wages of \$15 a week, with learners receiving \$13 for the first six months. Outside delivery men and maintenance employees are exempted from limitation on hours provided they are paid time and one-third for all time over 48 hours a week. Following the adjournment of the hearing members of the industry met with NRA advisers to whip the code into final shape for submission to the President.

New Officers Elected

The following officers were elected by the association to serve in the ensuing year:

Col. George H. Cherrington, president, Brown & Zortman Machinery Co., Pittsburgh, president; W. F. McCarthy, vice-president, Henry Prentiss & Co., New York, vice-president; Harry Barney, president, Barney Machinery Co., Pittsburgh, secretary-treasurer.

New members of the executive committee are Charles E. Moore, Herberts-Moore Machinery Co., Los Angeles; Norton Booz, Federal Machinery Co., Chicago, and H. L. Rich, Lynd-Farquhar Co., Boston.

Malleable Castings in September

WASHINGTON, Oct. 31.—September production of malleable iron castings amounted to 27,078 net tons, according to reports to the Bureau of the Census from 112 companies. This compares with production of 31,811 tons in August and with 10,051 tons in September, 1932. Nine months' production this year was 200,445 tons, as against 131,455 tons in the corresponding 1932 period. September shipments were 25,402 tons, compared with 30,195 tons in August and 9746 tons in September, 1932. Orders booked during September declined to 22,744 tons from 28,323 tons in August. September, 1932, orders were 10,582 tons.

Steel Companies Suppress Justified Resentment in the Interests of National Recovery

By G. L. LACHER
Managing Editor, The Iron Age

AT a time when costs are mounting, owing to compliance with the provisions of the National Recovery Act, the steel industry has been pilloried by a Government official for reducing prices. A paradox indeed, and hard to understand unless one is blinded to ignorance, prejudice, or hysteria.

Because the rail producers made a uniform reduction in prices to \$37.75 a gross ton, Joseph B. Eastman, Federal Coordinator of Transportation, charged them with collusion and gave them the alternative of accepting the price of \$35 which he had suggested as acceptable or of opening their cost records for Government inspection.

Mr. Eastman did not say whether the steel producers would have been guilty of collusion if they had all filed a price of \$35. Yet if they had done so, there would have been the same uniformity of which he complains. In fact, uniformity of price is inevitable under the operations of the steel code, adopted by the industry in conformity with the dictates of this Administration's major legislation.

One of the main purposes of the recovery program was to wipe out under-cover competition. Open prices openly arrived at were insisted on in all codes, including the steel code. As a consequence, all members of the steel industry have immediate knowledge of every price change filed under code rules. Uniformity in the recent reduction in the rail prices meant nothing more than that all mills met the lowest price filed, as they were privileged to do.

It is common knowledge that some producers were opposed to any reduction whatsoever, but once a cut was made they had no alternative but to meet it if they expected to share in tonnage sorely needed to keep their workers employed.

Except for the employment aspect of the situation it is doubtful whether any mill would have made a concession from the former price. The steel industry could see no merit in the coordinator's insistence that they risk going deeper into the red simply because certain financially embarrassed railroads wanted a lower price. Why should one industry be asked to shoulder the burdens of another? Surely not on the grounds of unbalanced price relationships. Open-hearth rails, at \$40 a gross ton, were 33 1/3 per cent higher than before the war. The cost of transporting finished steel

to consumers in Official Classification territory has gone up 90 per cent since 1913.

One of the steel company letters sent to Coordinator Eastman expressly stated that the price reduction was "temporary only" and was made "in the interest of getting our men back to work, and for the public good." This passage is a typical expression of the public spirit of members of the industry. They have been willing to go far to insure the success of the nation's struggle for recovery. Their attitude throughout the various steps in the Administration's program has been one of cooperation, conciliation and patience in the face of repeated irritation and provocation on the part of labor. They have been actuated by a sense of social responsibility which has led them to make all possible concessions compatible with their duty to stockholders.

But instead of winning recognition for the part they have played, they have been subjected to an intemperate demagogic attack. Almost simultaneous with Coordinator Eastman's demand that they drop their rail price

to \$35 or open their books for an examination of costs came the news that one of the rail producers is about to be sold "under the hammer." An unprejudiced observer might reasonably inquire why the one company which has been most dependent on rail business has failed to weather the depression. Surely if rail tonnage had been so profitable, that company should be the strongest financially, rather than the weakest.

But continuation of a controversy so inappropriately provoked by the coordinator would do little good and much harm at a time when industrial activity is slumping and workmen face increasing unemployment. With admirable self control the steel companies have suppressed justified resentment against Mr. Eastman's unjustified attack and in the interests of the national welfare have made a further cut in their prices. The reduction to \$36.37 1/2 a gross ton, agreed to in a conference of the mills with the President last Monday, does not alter their position that lower prices are unwarranted by the facts nor their opposition to the principle of mandatory price recommendations by Government officials. It is rather another indication of the high sense of public duty that has characterized the conduct of the industry ever since the recovery program was launched.

Violence in Detroit Tool and Die Strike

FOR the first time since the tool and die strike began more than six weeks ago serious disorder broke out in the last few days.

The trouble started early Saturday morning when a group of several thousand men gathered at the East Verner Highway plant of the Briggs Mfg. Co., and later at the factory of the Federal Engineering Co., overturning cars of employees and breaking windows. The violence was renewed Monday when a roving band of men in automobiles variously estimated at from 500 to several thousand in number moved from plant to plant about the city smashing windows, attempting to seize and destroy blue prints and intimidating workmen.

The mob staged riots at the Midland Steel Products Co., one of the divisions of Murray Corp., Koestlin

Tool and Die Corp., Faigle Tool and Die Co., F. Joseph Lamb Co., and East Side Gear and Tool Co. Jay J. Griffin, chairman of the strikers' committee, declared that no members of the Mechanic Educational Society were among the rioters. Because of the violence several tool and die making establishments closed Monday afternoon and sent their employees home.

Very slow progress is being made in negotiations between strikers and individual companies looking toward an end of the strike. Edward F. Fisher, vice-president, Fisher Body Corp., has met twice with the strike committee and W. S. Knudsen, executive vice-president General Motors Corp., is discussing a settlement with the men on behalf of the corporation's divisions at Pontiac and Flint.

Los Angeles has awarded 289 tons of 14 gage black sheets to California Pipe & Supply Co.

President Splits the Difference With Rail Makers

Agrees to Price of \$36.375 Per Ton, Without Insistence On Cost Examination

WASHINGTON, Oct. 31.—What had promised to be a long drawn out controversy between Transportation Coordinator Joseph B. Eastman and the rail makers over the matter of price, came to an abrupt settlement Monday, when President Roosevelt "split the difference" with the bidders. The price demanded by the coordinator was \$35.00 per ton; that offered by the four rail producing companies was \$37.75 per ton. The neat solution of this knotty problem was effected by striking an average.

At the price of \$36.375, it is not likely that there will ensue a bull market for steel stocks on the anticipation of rail making profits. It is safe to say that even at the old price of \$43.00, rail capacity, during the past ten years has been regarded as more of a liability than an asset. However, if the new bargain price for rails is productive of sufficient volume to enable the makers to break even, they will doubtless consider themselves lucky and will place this experience alongside of the recent \$100,000,000 increase in wages as an additional contribution to the cause of re-employment.

A statement issued from the White House in connection with the rail price agreement, sets forth the respective positions of the steel companies and the coordinator, and clearly explains the reason for the uniformity of price quotations which aroused Mr. Eastman's ire. The statement follows:

The President and the Federal Coordinator of Transportation met today with the steel rail manufacturers, who explained that the recent offer of all four companies to supply steel rails at the uniform price of \$37.75 a ton was based on the following understanding by them of the steel code provisions:

The United States Steel Corporation states that without consultation with the other manufacturers and in conformity with the code, it notified the Iron and Steel Institute that it proposed to reduce its price for steel rails from \$40 a ton to \$37.75 a ton.

This notice having been given to the institute, became public property, and thereupon the other three manufacturers of steel rails reduced their price to meet the price established by the Steel Corporation.

At the conference today the steel rail manufacturers maintained the position that the price of \$37.75 per ton represented to them only the cost of production plus a fair profit. The coordinator of transportation stated again his belief

that not more than \$35 a ton would represent a fair purchase price.

In the interest of getting people to work in the heavy industry of producing

Another Captive Mine Agreement Reached

AN agreement was reached Monday, Oct. 30, at a White House conference, between the President, NRA representatives, and steel officials representing captive mine ownership, through which it is hoped to end the long drawn out controversy which has kept 30,000 men idle for the past three months.

Under the terms of this agreement, the miners, represented by John L. Lewis, president, United Mine Workers of America, will return to work; the operators will accept them without discrimination and a formal contract will be written as soon as possible. As a preliminary to this contract, elections will be held under the auspices of the Labor Board through which the workers will choose representatives for collective bargaining. These may be members of the United Mine Workers or any other labor organization.

A statement, which follows, was issued from the White House, outlining the general terms of the agreement:

Substantial agreement was reached today between the President, General Hugh S. Johnson and the "captive" mine owners on the one hand and by the President, General Johnson and the United Mine Workers on the other hand.

This agreement provides a basis for the immediate re-employment of thousands of coal miners who are now idle if the following measures are put into effect.

Every mine which has an outlet for its products should be reopened and employes working when the mine last operated put back to work without any discrimination as to membership in any labor organization.

The check-off is conceded. A man may assign a deduction from his pay to whom-ever he desires.

The existing Appalachian agreement between the commercial mine operators and the United Mine Workers will fix the hours, wages and working conditions under which the men will go back to work, and this will be posted at every mine.

A formal agreement which shall contain terms and conditions at least as fav-

steel rails, the president proposed a price half way between, or \$36.375 a ton.

This price was accepted and the coordinator will advise the Administrator of Public Works of this decision and of the actual tonnage needs of the various railroads.

Just how much tonnage will result from rail orders at the new price is problematical. The previous estimate of 850,000 tons was based upon an assumed price of \$35.00 per ton. However there might be a good opportunity in this case to test the effectiveness of the "buy now" campaign under official administrative persuasion extended to buyers in the same measure as it has been to sellers.

orable as the Appalachian agreement will be made between the captive mine operators and the representatives of their employes selected as follows:

When after the opening of any mine, in the opinion of the National Labor Board orderly conditions have been restored and the protection of men working is assured, an election will be held under the exclusive regulation and direction of the National Labor Board and representatives will then be chosen for collective bargaining.

Such representatives may or may not be members of any labor organization and any officer, national, State or local, of the United Mine Workers of America may be elected, and if elected, the operators agree to negotiate with him to a conclusion on the following principles:

The representatives chosen by a majority will be given an immediate conference and separate conferences will be held with any representatives of a substantial minority. If no agreement with the majority representatives is reached in ten days the controversy will be immediately submitted by both parties to the National Labor Board for decision and both parties will agree to abide by the decision.

While newspaper comment, as usual, interprets the agreement as a victory for Mr. Lewis' organization, since it mentions the members of the U. M. W. as eligible as collective bargainers, if elected, it qualifies this recognition by extending equal recognition to members of any labor organization, or to non-members under the same terms. It also provides for minority representation.

The check-off is "conceded" but under the identical qualification insisted upon by the operators at their last White House conference, namely that individual assignments must be made by the worker authorizing "deductions from his pay to whomever he desires." This is quite different from the accepted definition of the check-off as a horizontal shaving of the entire payroll, without individual authorization, in favor of the United Mine Workers' Union.

SUMMARY OF THIS WEEK'S BUSINESS

Rail Agreement Comes at a Time When General Demand Is Falling Sharply

Releases of Virtually All Products Except Tin Plate Show Pronounced Decrease
—Pig Iron Output Off 14 Per Cent in October

PIG iron production declined 14 per cent in October, according to estimates obtained by THE IRON AGE on the last day of the month. The October daily rate was 43,320 tons compared with a September average of 50,742 tons a day. Total output last month was 1,342,936 tons against 1,522,257 tons in September. Eleven fewer furnaces were in blast on Oct. 31 than on Oct. 1.

BUSINESS in all forms of finished steel except tin plate continues to drop off sharply, and the recession in bookings is reflected in production. The decline of nearly six points in raw steel output to 26.1 per cent reported Monday probably fails to measure the full extent of the shrinkage in demand, since certain steel units which have not yet shut down are stocking ingots. Under the circumstances the reaching of an agreement on a rail price comes at an opportune time, not only because it promises an early release of orders for 1,000,000 tons of rails and track material but because it opens the way for a Government-sponsored railroad equipment program.

Aside from the railroad buying program the only prospective source of heavier tonnage is public works. Public projects, however, are maturing slowly. Although they account for the lion's share of current structural awards, weekly lettings are still far below what would be considered large tonnages. Total awards for the present week are only 16,450 tons.

AUTOMOBILE production continues to fall and is expected to strike its low point for the year in November. Chevrolet has cleaned up its 1933 run and its plants are down pending the launching of production on its new model. Likewise Chrysler units will be idle most of the month. Ford, on the other hand, has boosted output from 500 to 750 cars a day. No important steel orders from the automotive industry are expected until the latter part of December. Most motor car builders anticipated their needs to protect themselves against price advances. One promi-

nent company has 25,000 to 30,000 tons of steel stored at a Detroit dock and probably will not move it to its plant for another 30 days.

Meanwhile the only gain in steel specifications reported is attributable to technical provisions of the steel code rather than to any increase in demand. An end-of-the-month bulge in bar, plate and shape releases came from consumers having monthly quota contracts under which all unspecified tonnage is automatically canceled.

NUMEROUS amendments to the steel code are being made as experience discloses its imperfections. A commercial resolution adopted last week is intended to correct methods of selling certain products to the railroads under which the buyers have found it to their advantage to place business with distant mills rather than with nearby producers.

THE IRON AGE composite price for scrap has declined from \$10.25 to \$10.17 a gross ton. The only buoyant influence in scrap is a growing demand for material for export. The finished steel composite has declined from 2.036c. to 2.023c. a lb., reflecting the first rail reduction, which became effective under the code on Monday. The second reduction in rails to \$36.37½ has been filed but will not actually go into effect until Nov. 9. The 1934 tin plate price is expected to be announced by Nov. 15, and there continues to be talk of a further advance on bars. THE IRON AGE pig iron composite is unchanged at \$16.61 a gross ton.

INGOT output has dropped five points to 25 per cent of capacity at Pittsburgh, seven points to 30 per cent at Chicago, five points to 22 per cent in eastern Pennsylvania, 10 points to 35 per cent in the Valleys, four points to 26 per cent at Cleveland, 15 points to 40 per cent in the Wheeling district, and 20 points to 17 per cent in the South. The Detroit rate is unchanged at 55 per cent and the Buffalo average at 21 per cent.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron	Oct. 31, 1933	Oct. 24, 1933	Oct. 3, 1933	Nov. 1, 1932
<i>Per Gross Ton:</i>				
No. 2 fdy., Philadelphia.....	\$18.26	\$18.26	\$18.26	\$13.59
No. 2, Valley furnace.....	17.50	17.50	17.50	14.50
No. 2 Southern, Cin'tl.....	18.13	18.13	18.13	13.82
No. 2, Birmingham.....	13.50	13.50	13.50	11.00
No. 2 foundry, Chicago*.....	17.50	17.50	17.50	15.50
Basic, del'd eastern Pa.....	17.76	17.76	17.76	13.50
Basic, Valley furnace.....	17.00	17.00	17.00	13.50
Valley Bessemer, del'd P'gh..	19.76	19.76	19.76	16.89
Malleable, Chicago*.....	17.50	17.50	17.50	15.50
Malleable, Valley.....	17.50	17.50	17.50	14.50
L. S. charcoal, Chicago.....	23.54	23.54	23.54	23.17
Ferromanganese, seab'd car-				
lots	\$2.00	\$2.00	\$2.00	68.00

*The average switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Finished Steel	Oct. 31, 1933	Oct. 24, 1933	Oct. 3, 1933	Nov. 1, 1932
<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.25	2.25	2.25	2.10
Hot-rolled annealed sheets, No. 24, Chicago dist. mill..	2.35	2.35	2.35	2.20
Sheets, galv., No. 24, P'gh...	2.85	2.85	2.85	2.85
Sheets, galv., No. 24, Chicago dist. mill.....	2.95	2.95	2.95	2.95
Hot-rolled sheets, No. 10, P'gh	1.75	1.75	1.75	1.55
Hot-rolled sheets, No. 10, Chi- cago dist. mill.....	1.85	1.85	1.85	1.65
Wire nails, Pittsburgh.....	2.10	2.10	2.10	1.95
Wire nails, Chicago dist. mill	2.15	2.15	2.15	2.00
Plain wire, Pittsburgh.....	2.10	2.10	2.10	2.20
Plain wire, Chicago dist. mill.	2.15	2.15	2.15	2.25
Barbed wire, galv., Pittsburgh	2.60	2.60	2.60	2.60
Barbed wire, galv., Chicago dist. mill.....	2.65	2.65	2.65	2.65
Tin plate, 100 lb. box, P'gh.	\$4.65	\$4.65	\$4.65	\$4.75

Rails, Billets, etc.

<i>Per Gross Ton:</i>				
Rails, heavy, at mill.....	\$37.75	\$40.00	\$40.00	\$40.00
Light rails at mill.....	32.00	32.00	32.00	30.00
Rerolling billets, Pittsburgh..	26.00	26.00	26.00	26.00
Sheet bars, Pittsburgh.....	26.00	26.00	26.00	26.00
Slabs, Pittsburgh.....	26.00	26.00	26.00	26.00
Forging billets, Pittsburgh...	31.00	31.00	31.00	31.00
Wire rods, Pittsburgh.....	35.00	35.00	35.00	37.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb....	1.60	1.60	1.60	1.60

Scrap

<i>Per Gross Ton:</i>				
Heavy melting steel, P'gh....	\$11.75	\$11.75	\$12.75	\$9.25
Heavy melting steel, Phila...	10.00	10.00	10.50	7.25
Heavy melting steel, Ch'go...	8.75	9.00	9.62 1/2	6.00
Carwheels, Chicago.....	9.50	9.50	10.00	7.00
Carwheels, Philadelphia.....	11.75	11.75	12.25	9.50
No. 1 cast, Pittsburgh.....	11.75	11.75	11.75	10.00
No. 1 cast, Philadelphia.....	11.50	11.50	11.50	9.50
No. 1 cast, Ch'go (net ton)...	9.00	9.50	10.00	6.25
No. 1 RR. wrot., Phila.....	11.00	11.00	12.00	7.50
No. 1 RR. wrot., Ch'go (net).	7.75	7.75	8.50	4.50

Finished Steel

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.75	1.75	1.75	1.60
Bars, Chicago.....	1.80	1.80	1.80	1.70
Bars, Cleveland.....	1.80	1.80	1.80	1.65
Bars, New York.....	2.08	2.08	2.08	1.95
Tank plates, Pittsburgh.....	1.70	1.70	1.70	1.60
Tank plates, Chicago.....	1.75	1.75	1.75	1.70
Tank plates, New York.....	1.98	1.98	1.98	1.898
Structural shapes, Pittsburgh.	1.70	1.70	1.70	1.60
Structural shapes, Chicago...	1.75	1.75	1.75	1.70
Structural shapes, New York.	1.95 1/4	1.95 1/4	1.95 1/4	1.86775
Cold-finished bars, Pittsburgh	1.95	1.95	1.95	1.70
Hot-rolled strips, Pittsburgh.	1.75	1.75	1.75	1.45
Cold-rolled strips, Pittsburgh.	2.40	2.40	2.40	2.00

Coke, Connellsville

<i>Per Net Ton at Oven:</i>				
Furnace coke, prompt.....	\$3.75	\$3.75	\$2.50	\$1.75
Foundry coke, prompt.....	4.25	4.25	3.25	2.75

Metals

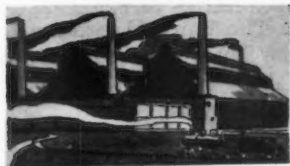
<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Electrolytic copper, refinery..	8.00	7.50	8.75	5.00
Lake copper, New York.....	8.25	8.00	9.00	5.25
Tin (Straits), New York....	49.00	48.12 1/2	48.62 1/2	23.35
Zinc, East St. Louis.....	4.75	4.75	4.75	3.00
Zinc, New York.....	5.10	5.12	5.12	3.37
Lead, St. Louis.....	4.15	3.90	4.35	2.87 1/2
Lead, New York.....	4.30	4.00	4.50	3.00
Antimony (Asiatic), N. Y....	6.70	6.75	7.00	5.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
Oct. 31, 1933	2.023c. a Lb.	\$16.61 a Gross Ton	\$10.17 a Gross Ton
One week ago	2.036c.	16.61	10.25
One month ago	2.036c.	16.61	10.96
One year ago	1.948c.	13.59	7.50
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.
	HIGH	HIGH	HIGH
1933	2.036c., Oct. 3	\$16.71, Aug. 29	\$12.25, Aug. 8
1932	1.977c., Oct. 4	14.81, Jan. 5	8.50, Jan. 12
1931	2.037c., Jan. 13	15.90, Jan. 6	11.33, Jan. 6
1930	2.273c., Jan. 7	18.21, Jan. 7	15.00, Feb. 18
1929	2.317c., April 2	18.71, May 14	17.58, Jan. 29
1928	2.286c., Dec. 11	18.59, Nov. 27	16.50, Dec. 31
1927	2.402c., Jan. 4	19.71, Jan. 4	15.25, Jan. 11
	LOW	LOW	LOW
1933	1.867c., Apr. 18	\$13.56, Jan. 3	\$6.75, Jan. 3
1932	1.926c., Feb. 2	13.56, Dec. 6	6.42, July 5
1931	1.945c., Dec. 29	14.79, Dec. 15	8.50, Dec. 29
1930	2.018c., Dec. 9	15.90, Dec. 16	11.25, Dec. 9
1929	2.217c., July 17	17.04, July 24	14.08, Dec. 3
1928	2.212c., Nov. 1	17.54, Nov. 1	13.08, July 2
1927			13.08, Nov. 22

Washington Agreements Renew Hope at Pittsburgh



Apparent Settlement of Rail and Captive Mine Issues Clears Atmosphere—Ingot Production in Further Recession

PITTSBURGH, Oct. 31.—News of agreement on the captive mine controversy and of a settlement of the price of steel rails has revived the ebbing spirits of the local steel industry. Although final settlement of captive mine strikes will depend upon the outcome of an election to be held under the auspices of the National Labor Board, the preliminary agreement has at least cleared the atmosphere of a depressing influence that has long hovered over the steel industry. Establishment of a price of \$36.37½ a gross ton on steel rails will undoubtedly speed action of heavy rail purchases.

Local steel producers have generally completed the bulk of outstanding commitments, and fourth quarter backlogs are at the vanishing point. The very limited character of new business has necessitated further downward revisions in operations. An independent producer, who suspended operations more than a week ago, is still inactive. Ingot output in the Pittsburgh area this week will average not more than 25 per cent of capacity. Four steel company blast furnaces in this district were banked during the past week. Operations in the Wheeling district are off sharply at 40 per cent. Production in the Valleys and nearby northern Ohio districts has dropped to about 35 per cent of capacity.

With the exception of prospective rail orders, new steel tonnage in the offing is not particularly encouraging. Demand from the automotive industry, whose engagement on new models has been hampered by lingering labor difficulties among tool and die workers, is not expected to increase measurably until late in the fourth quarter. Sheet and strip mills are consequently further scaling down rolling schedules, which currently average less than 40 per cent.

Capacity operations at tin plate mills is practically assured for the remainder of the quarter by the well sustained flow of heavy specifications. The 1934 tin plate price will probably be announced within the next fortnight.

Primary materials markets are extremely sluggish. Trading in scrap has practically halted, and prices are purely nominal at unchanged levels.

Pig Iron

The week has been virtually bare of interest from either non-integrated steel mills or the foundry trade. Shipments against contracts are slow, but full acceptances against old low-priced orders are generally expected by the close of the year. Prices remain unchanged for delivery through fourth quarter. If fuel costs remain at their present high levels for a prolonged period, an upward adjustment in pig iron prices is considered inevitable. Present furnace stocks, however, represent production accomplished with fuel stocked prior to the recent price increases.

Semi-Finished Steel

Billets and slabs are being specified more cautiously by non-integrated mills. Sheet and tin plate units continue to take sheet cars at a relatively satisfactory rate. Aggregate movement of semi-finished steel, however, has shrunk markedly, with no improvement in sight for the remainder of the quarter. Quotations are unchanged for shipment through December, with billets, slabs and sheet bars at \$26; forging billets at \$31, and skelp at 1.60c., Pittsburgh or Youngstown.

Rails and Track Accessories

Final agreement on a rail price of \$36.37½ a gross ton will, it is hoped, result in the early placing of 800,000 to 850,000 tons. Although there is a good deal of talk that railroad purchases may be expanded later to include rolling stock and locomotives, which would undoubtedly provide a broad impetus to steel demand, no definite program has yet been launched. The local rail mill is now inactive, having completed rolling against orders early last week.

Warehouse Business

Further revised warehouse schedules for delivery within free delivery zone at Pittsburgh became effective last week. Base quotations now apply to 400 to 9000 lb., whereas the base quantity formerly was 400 to 3999 lb. On orders for less than 400 lb. an extra of 50c. per 100 lb. will be added to the base price. For 40,000 lb. lots and larger a concession of 35c. a lb. will apply; the allowance formerly

was 60c. per 100 lb. For shipment outside the Pittsburgh district base prices are 10c. per 100 lb. lower, but are subject to less carload or carload freight rates to destination.

Bars

Bookings for October fell considerably under those in September. Demand from the automotive industry is particularly lagging. Bar mill production is consequently falling off, and schedules at the beginning of November are lower than they have been in many months. Prices for fourth quarter are unchanged. While higher prices are believed to be under consideration, filing of advanced quotations has not been reported.

Plates and Shapes

The plate market is fairly active, with one or two relatively large inquiries being figured. Bids on 48 Government pontoons will be opened at Memphis today, and inquiry for prices on 24 steel barges for a Chicago interest has been issued. Barge repair work is also accounting for a share of current calls for plates. Demand from other consuming quarters is still rather drab. Takings by the railroads are restricted to small lots for repair work. New tank construction offers practically no support.

Structural steel inquiry improved somewhat in the past week, with requirements of several new projects running into fairly substantial tonnage. Bids are being taken on 12,500 tons for towers and anchorage cable bents for the Tri-Borough Bridge, New York. Boulder Dam drum gates will require about 2000 tons of shapes. Dec. 12 has been set for opening of bids on a roller crest dam on the Ohio River at Montgomery Island, near Pittsburgh, but steel requirements for this project have not yet been determined. Awards for the week increased, with State highway bridge contracts predominating.

Sheets

Further recession in sheet mill operations has attended the general completion of third quarter specifications. Current operations average slightly below 40 per cent. New business is in poor volume. Demand from the motor car makers has noticeably diminished because of delays in getting into production on new models, and little improvement from that source is expected for some weeks. Calls from miscellaneous sheet consumers, such as manufacturers of stoves, washing machines, radios and refrigerators, lack vigor. Demand from agricultural implement makers is also restricted. Quotations are unchanged for the remainder of the quarter.

Strip Steel

Demand for both hot-rolled and cold-rolled strip steel is very spotty. Practically all important consumers covered amply against third quarter

contracts, and until inventories become well depleted very little new buying is in store. Current activity is particularly depressed by the diminished requirements of the automotive industry.

Cold-Finished Steel Bars

Specifications are barely holding their own. Movement to practically all important consumers has diminished, and no occasion for early significant buying is discernible in the face of ample consumer stocks. Cold-finished bars are quotably unchanged at 1.95c., Pittsburgh.

Tin Plate

Practically full engagement of tin plate mills is assured for the remainder of the quarter by the continued satisfactory volume of specifications against old contracts. With Nov. 15 the usual deadline for specifications against 1933 orders, some announcement on next year's price is likely about the middle of next month. Little spot business is being placed at the current quotation of \$4.65 per box. Export orders are considered very satisfactory, with a relatively substantial tonnage having been booked recently for shipment to Italy.

Tubular Products

No improvement in demand for tubular goods was noticeable in the past week. New pipe line projects are very scarce, and diminished activity in oil fields has further depressed the demand for drill pipe and oil country goods. Standard pipe is moving slowly in small lots. Orders for seamless tubing are infrequent. Specifications from the railroads for boiler tubes, while in negligible volume, are expected to pick up when and if the purchasing program of the carriers gets under way.

Wire Products

With the exception of a few fill-in orders, new business is slack. Government work accounts for the bulk of current demand. State road projects are opening up a fairly sizable volume of inquiry for wire mesh, but mills do not expect to benefit measurably from this work until next spring. A leading wire mill in this district has suspended operations until such time as accumulation of orders warrants resumption. Prices are unchanged for shipment through December.

Coke and Coal

Although beehive and foundry coke production continues to increase, consumer interest is still at a low point. Premium brands of Connellsville foundry coke, which had been offered at \$5.25 on contract and \$5.75 for spot shipment, are now available for both prompt and contract delivery at \$5.25, ovens. Standard Connellsville foundry coke is freely offered at as low as \$4.25, ovens. Furnace coke is available

at \$3.75. Coal markets are inactive. With practically all commercial mines in operation, tonnage is more readily available, but minimum code prices in effect on bituminous coal are not attracting significant buying. Current activity is limited almost entirely to scattered spot purchases.

Scrap

Dealers report a complete absence of consumer interest in all grades of scrap. In the absence of trading, prices are nominally unchanged, with no indication of strength. No. 1 heavy melting steel continues to be quotable at \$11.50 to \$12. Complete suspension of shipments to most large mills is still in effect. Dealer order books are practically bare of orders. The Pennsylvania Railroad list, which closes tomorrow, covers 28,500 tons, including 4800 tons of No. 1 heavy melting steel. The Baltimore & Ohio list of 6500 tons, which will be closed on Nov. 6, includes only 1500 tons of No. 1 steel.

Finished Steel Rates From Worcester

IN the Oct. 12 issue of THE IRON AGE, page 35, a typographical error was made in the table of freight rates on finished steel products to New York State points. The column of rates from Worcester, Mass., was erroneously headed "Cleveland."

Steel Construction Slumped in September

FORWARD business of the steel construction industry recorded a sharp slump during September. The bookings of new orders during the month were also lower, although the shipments were not much below those for August.

Following is a complete tabulation of the reports received:

RESULTS OF STATISTICAL COMPILATION—SEPTEMBER, 1933

	1932 Average per Month	First Half 1933 Average per Month	July, 1933	*August, 1933	Septem- ber, 1933
Number of companies reporting	129	183	192	188	182
Tonnage booked	53,688	63,252	56,482	78,379	57,642
Tonnage shipped	64,486	55,475	51,303	67,913	64,362
Tonnage on hand for future fabrication—Companies reported...	(69)81,773	(89)273,128	(104)347,798	(112)338,678	(104)288,863
Companies reporting no work ahead	35	58	44	36	40
Companies making no report on work ahead	25	36	44	40	38
Percentage of industry reporting, per cent...	..	84	85	84	84

*Revised.

Production in Sharp Drop in the South

BIRMINGHAM, Oct. 31.—This week steel production will drop to the lowest point since March. Only four out of 24 open-hearth furnaces are being worked. The Fairfield open-hearth plant of the Tennessee Coal, Iron & Railroad Co. closed down today and will remain idle until Sunday. Last week four units were worked by the Tennessee company, a reduction of two from the schedule of the previous six weeks. Gulf States Steel Co. operated five open-hearths last week, making a total of nine for the district. One unit has been taken off this week by Gulf States Steel and its total of four is also the total for the district.

Operations of the Fairfield finishing mills have also been curtailed; some mills being closed for the week and others working on restricted schedules.

The steel market continues to drag, with new tonnage small and disappointing.

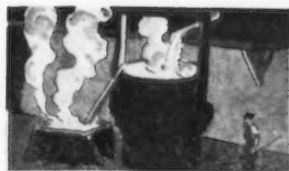
Blast furnace operations are unchanged from a week ago.

October saw a definite loss of two furnaces. Woodward Iron and the Tennessee company each banked a stack for an indefinite period.

There is little new demand for pig iron, on account of previous contracts and the slackening requirements of foundries. The combined shipments of the three merchant producers were slightly in advance of those for September. The pipe industry is still bogged down. October business was no better than that of September, although several orders were larger than any booked in the previous month.

Chicago is in the market for 500 sets of wheels and axles for tunnel cars.

Chicago Ingot Rate Falls Another Seven Points



**Production Now Averages 30 Per Cent
and Further Recession Is Due Unless Rail
Orders Are Soon Distributed—Scrap Off
Again**

CHICAGO, Oct. 31.—With an agreement reached on a rail price of \$36.37½ a ton, which is midway between the price previously offered by mills and that demanded by Government officials, it now remains to be seen how soon this will result in orders, which are badly needed by mills at this time to bolster sagging production.

For the second consecutive week ingot output has dropped sharply, the average in this district now being only 30 per cent of capacity, a drop of seven points in as many days.

From all outward indications only the prospective rail tonnage can retard or halt this downward trend. Public works are now being thrown into the breach, but they are not sufficient to stem the tide in the face of slackening demand from almost all industrial sources of steel mill business.

Specifications for finished steel products continue to decline and new buying is of little moment. In fact, to date, only a small part of orders on mill books have been taken at the prices established under the steel code.

Pig Iron

New buying remains dull. Most users find old orders more than ample to meet all current needs. October shipments are moderately lower than September, but the movement through the remainder of the year should be well maintained because it can be expected that all old commitments made at lower prices than now prevail and which expire Dec. 31 will be taken out in the course of the next eight or nine weeks. This situation makes for difficulty in gaging the melt against shipments. Consensus of opinion is that furnace shipments are in excess of foundry melt. Demand for both Southern and charcoal iron is very dull.

Coke

Foundry coke has been marked up 50c. a ton to \$8.50 for delivery during November. October shipments fell 12 per cent below September.

Cast Iron Pipe

Except for a small inquiry by Chicago for 200 tons of 20-in. pipe, this market is dormant. The low bidder on the general contract at Green Bay, Wis., has been announced and neces-

sary pipe should be purchased in the near future. Evanston, Ill., which had arranged for a loan for an elevated water tank and extension to mains, has forfeited the loan and has dropped the project.

Reinforcing Bars

Few developments are taking place in this market. Tonnages for dams on the upper Mississippi River are still open and housing projects planned for Chicago appear to have been dropped. Some remodeling work has made its appearance but the aggregate tonnage is very small. Cook County, Ill., has awarded 100 tons for paving, and the State of Illinois will buy 450 tons for bridges.

Warehouse Business

October proved to be the second best month of the year, having run a close race with July, which was the leading month in number of orders received. By mid-October orders started to drop and this tendency is expected to continue through the remainder of the year. Warehousemen put into effect Nov. 1 new quantity differentials on bars, plates, shapes, hoops, bands, blue annealed sheets and floor plates. New discounts are being named on bolts, nuts, coach and lag screws, and cap screws.

Steel Sheet Piling

Orders are now being placed for the piling needed for dams and locks on the upper Mississippi River. It has been decided to construct the breakwater at Indiana Harbor, Ind., on the rubble mound principle and steel piling will not be required. Prices were raised \$2 a ton to 2.10c. a lb., effective Nov. 1.

Rails and Track Supplies

It is hoped that rail buying will soon develop now that the matter of price has been settled. Some scattered orders for track fastenings have been received, the aggregate tonnage clearly indicating that demand for general maintenance work is diminishing as the fall season advances.

Wire Products

Output is down another five points to an average from 35 to 40 per cent of capacity. Buying in farm areas is practically non-existent. This situation is in all essential respects a buy-

ers' strike, which at first was most noticeable in the Central West, but which now has spread to all parts of the country. Late in the summer it had been anticipated that automobile builders would by this time be in need of larger quantities of steel. This tonnage has not come out and the course of events in the near future is not clearly defined. Wire producers are very conservative as to building up stocks, which are well below normal for this time of year. In general, there is no real effort to build stocks.

Structural Material

The dam across the Mississippi River at Fountain City, Wis., requiring 2500 tons of steel has been awarded, as has the dam at Alma, Wis. It is probable that the gates at Muscatine, Iowa, will be let in the next few days. Total structural awards are 5300 tons and fresh inquiries aggregate 5100 tons, the bulk of which result from the contemplated expenditure of public money.

Plates

The bulk of current plate business is accounted for by the tonnage needed for dams and locks on the Mississippi River. One Western railroad is buying 1200 tons of car repair material and the Great Northern is repairing five locomotives in its own shops, the work involving new boilers. Materials have been purchased for the 500 refrigerator cars that are being built by Armour.

Bars

Although demand for bar mill products is still in the lead of other finished steel mill products, yet consumption is off rather sharply in practically all fields, one exception being bars used for bridge work.

Sheets

Output has been lowered to 40 per cent of capacity. New business is scattered and individual lots are small. However, in the aggregate, sheets are reaching mills in better volume, in proportion to capacity, than are other steel mill products.

Scrap

A small purchase of heavy melting steel has established a new low price of \$9 a gross ton, delivered, a drop of 25c. below the previous sale. Acceptances are so restricted that most brokers would at this time be willing to sell at a still lower price if buyers would take shipments promptly. The Burlington has sold this grade at the equivalent of \$8.90 and dealers will not now pay over \$8.75 a ton at the top. A boat load of heavy melting steel is scheduled to leave Chicago for Cleveland and an inquiry is pending from Buffalo for 50,000 tons of cast iron borings for immediate delivery. Sellers point out that accumulation of such a tonnage is impossible before navigation closes and they are inclined to believe the order may be extended for winter accumulation and delivery in the spring.

Eastern Pennsylvania Steel Production Declines Further



Demand Continues Very Sluggish With Mill Backlogs Practically Exhausted — Two Naval Cruisers Will Take 4000 Tons of Steel

PHILADELPHIA, Oct. 31 — Although finished steel demand in the eastern Pennsylvania district has not declined further in the last week, mill backlogs are so thoroughly exhausted that production has fallen rather sharply. Open-hearth capacity is engaged at only about 22 per cent and may drop further by the end of the week. At least two producers are not running their steel-making departments, although another is engaged at about 45 per cent. Stocks of raw steel have been built up sufficiently to permit intermittent schedules and finishing mill operations are likewise indefinite.

It is difficult to single out any individual product for which demand is at all satisfactory. Movement of structural steel and reinforcing bars is particularly disappointing in view of the promise of heavy public works construction this fall, which has been so slow to materialize. A large housing project to be financed partially by public funds is to be undertaken at Philadelphia, but will call for only 150 tons of structural steel. A much larger tonnage of reinforcing bars may be needed. Some improvements at the local Navy Yard are also in prospect. Philadelphia fabricators are also interested in the large seadrome project for which public funds are being sought, as there is now a good chance of the work being approved. About 125,000 tons of plates and shapes would be needed.

Pig Iron

Shipments are declining and significant buying is still absent. Nevertheless foundry operations are holding up fairly well in some cases and sellers expect more market interest by the end of November. Prices are unchanged and the prospect of an advance before first quarter quotations are announced seems more remote.

Bars, Plates and Shapes

Interest in this market is centered almost entirely on the future, as current business is very light. October structural steel and reinforcing bar awards fell considerably behind the previous month's totals and little work is actively pending. Highway lettings may continue through the greater part of the winter and other

Federal and State projects are being pushed for the earliest possible release. The Navy Department will take bids in the first half of November on about 4000 tons of plates and shapes for two cruisers to be built in Navy yards. Construction work at the Middletown, Pa., naval air station will also require a small tonnage and improvements at the Philadelphia Navy Yard will take an unstated tonnage of reinforcing steel. Plate demand in general is quiet. Brewery business has fallen off sharply and little new construction is now in prospect.

Sheets

Activity has shown no change in the last week. Many users seem to be covered for the remainder of the quarter and consumers who have been buying from hand to mouth are reduc-

Sheet Output Curtailed at Buffalo

BUFFALO, Oct. 31.—The Seneca sheet division of Bethlehem Steel Corp. has shut down its west plant entirely which has cut its operating average down to 40 per cent of capacity. Ingot output is unchanged. Three open-hearths at Bethlehem's Lackawanna plant and three at the Republic Steel Corp. works are active, while Wickwire-Spencer Corp. is operating two. A Buffalo fabricator has an order for 200 tons of sheet piling for a bulkhead for the Buffalo Coast Guard station.

The pig iron market continues quiet with only scattering small sales. So far as is known here, the Fairbanks Scale Co. inquiry for 500 to 1000 tons has not yet been placed, nor has the recent inquiry of the General Electric Co. for 800 tons, wanted by Dec. 31. Furnace operations remain unchanged, with six stacks active, though one of the Republic Steel Corp. furnaces may be banked within the next week or ten days.

Scrap demand has dropped to the vanishing point. Mills are operating on reduced schedules, and while it is probable that they would have to come into the market and pay higher price than are now being quoted in

ing their regular demands. Radio manufacturers in the district are still fairly busy and are taking out sheet steel in fair volume. The price structure is generally sound and code procedure is becoming more familiar to both buyers and sellers.

Warehouse Business

Shipments fell off slightly in the last half of the month. No price revisions have been made since Oct. 12 and schedules are now clearly defined.

Imports

The following iron and steel imports were received here last week: 5000 tons of manganese ore from British West Africa, 250 tons of ferromanganese from Germany and 75 tons of the same product from Poland, and 25 tons of tungsten ore from China.

Scrap

A local dealer is assembling material for an export cargo of 2000 to 3000 tons early in November. Prices for No. 1 steel are still holding around the recent \$10 level. Shipments against old orders are being completed in many cases and additional export movement may be expected unless local demand develops. With steel operations still declining, mills are showing no interest in purchases. Machine shop turnings are weaker and heavy axle turnings are off in sympathy with No. 1 steel.

the event that the long-awaited railroad buying should develop, they are not disposed to lay in big stocks, with the present uncertain operation. It is reported that a few small lots of No. 1 and No. 2 heavy melting steel have been purchased by the same mill that two weeks ago bought at \$9 and \$7.50 respectively.

Demand Slumps in Cincinnati District

CINCINNATI, Oct. 31.—Pig iron demand, the past month, was sustained at a conservative level of about 300 tons weekly, slightly better than in October, 1932, but noticeably below the heavy ordering in September of this year. Shipments, on the other hand, reached the highest level of the past two years, since furnace interests insisted on melters' fulfilling their contracts. During the past week some Northern furnaces have relaxed the rule on shipments, but Southern producers show no disposition to ease contract terms. The consensus is that pig iron will not be in any great demand for the next 30 days, but the rumored possibility of a first quarter price advance is expected to stimulate purchasing late in the fourth quarter. Foundries are operating at slow rate,

with stove foundries benefiting from the usual seasonal stimulus to business. The only pending inquiry is from a south central Ohio melter for 300 tons of Northern foundry iron.

Coke

Spot orders of foundry coke have improved slightly, giving a better tone to the market. Shipments are unchanged and prices steady.

Steel

Price stabilization on steel sheets has strengthened the technical tone of the district market, but demand is still off. Bookings, the past week, averaged less than 40 per cent of mill capacity and production was reduced to the same level.

Scrap

With mills piling scrap on old contracts, the district market is without trend. Current business is nil and prices are nominal. Dealers are not interested in speculative purchases.

Scrap Easier, Pig Iron Dull at Boston

BOSTON, Oct. 31.—Because virtually no market exists here for Pittsburgh district delivery, and business is, therefore, very largely confined to Worcester, Mass., and eastern Pennsylvania deliveries, prices for certain kinds of scrap have turned easier.

No. 1 heavy melting steel for eastern Pennsylvania delivery is moving in a small way at \$5.50 a ton, on cars shipping point, or \$10 a ton, delivered, and for Worcester delivery at \$6 a ton, on cars, or \$8 a ton, delivered. The last sales made for Pittsburgh delivery were at \$7 a ton, on cars.

No. 2 steel, for Worcester delivery, is moving at around \$7 a ton, or \$5, on cars shipping point, and bundled skeleton at \$6.75 a ton, delivered, or \$4.75, on cars. Small tonnages of steel turnings sold the past week at \$2.50 a ton, on cars, off 25c from previous sales, and breakable cast at \$5 a ton. There is a market for punchings and chemical borings but very few offerings.

The pig iron market has lapsed into a state of virtual stagnation, with little indication of showing life during the next month. However, the New England melt seems to be holding its own after a slight setback. Foundries have drawn heavily on contract iron and stocks in yards are steadily shrinking, so there is a chance buying may develop sooner than anticipated. Textile machinery makers, among the largest pig iron consumers, report new business as slim, but enough business on books to carry them until about Jan. 1. Most of them are well stocked with iron, so any buying that may develop probably will come from other consumers.

Steel Output in Further Slump at Cleveland



**Ingot Rate Off Four Points to 26 Per Cent
—Code Regulations Result in Month-
End Gain in Heavy Steel Releases**

CLEVELAND, Oct. 31.—The end of the month brought some improvement in specifications for steel bars, plates and structural shapes. These orders came from consumers having contracts in the form that binds them to take their steel in monthly quotas, the unspecified tonnage being automatically cancelled. While many buyers ordered out the full amount of steel permitted under their October quotas, thus retaining the benefit of the contract prices, others are allowing cancellation of part of their October quotas and will have to pay the higher current prices should they desire to purchase additional tonnage later. Some conservative buyers find that they will need more steel than they contracted for and will have to pay the present fourth quarter prices for additional material.

Ingot output in the Cleveland-Lorain territory again dropped this week, the taking off of two open-hearth furnaces causing a four-point decline to 26 per cent of capacity. Sheet and strip mill operations in this territory have further declined.

Pig Iron

Shipments in October to consumers outside the automotive field have been better than in September, but with the slump in orders from automotive foundries October shipments will fall about 25 per cent below the September tonnage. Not much improvement in the automotive demand is looked for in November because, with delays caused by the tool and die makers' strike, automobile manufacturers do not expect that they will get their foundries on good production schedules before December. New demand is light and restricted to small lots, most consumers being under contract for the quarter. One interest sold 2000 tons during the week.

Iron Ore

Shippers are well cleaned up with their shipping schedules and the water movement is declining rapidly. Few cargoes will be shipped after Nov. 7. The October movement is estimated at 4,400,000 tons as compared with 5,504,175 tons shipped in September. It is not expected that over 500,000 tons will be shipped in November. On the basis of these estimates, the total water movement for the season will be slightly over 21,000,000 tons.

Sheets

The market is dull, although the automotive industry placed some small-lot orders during the week and a little fill-in tonnage came from other sources. Jobbing stamping plants continued to figure on parts for new models of automobiles, but apparently none of this business has been placed. Most consumers still have good stocks.

Strip Steel

Specifications for both hot and cold-rolled strip were light for a few days, but improved somewhat this week through releases for November shipment from some of the automobile parts plants that were shut down last week for inventories. These plants have ordered about all the steel due on contracts placed a few weeks ago at the new prices.

Coke

While the by-product foundry coke price for the month usually is named a week before the end of the previous month, the price for November has not yet been announced. With higher prices on beehive coke, an advance is expected. Demand for foundry coke has shown some improvement recently.

Bars, Plates and Shapes

Interest in the construction field is centered on local public work, including the Easterly sewage disposal plant and water main extensions. For the former it is understood that 800 tons of reinforcing bars will go to a local mill, although the award has not been definitely made. Bids for tank work in connection with the same plant, requiring 2400 tons of bars and 1140 tons of plates, will be taken Thursday. The Ohio State highway department will take bids Nov. 10 for additional road and bridge projects, the list of which has not yet come out.

Scrap

Dealers have few outstanding orders, as most consumers have taken practically all the scrap due on contract. Consumers generally have good stocks and are making no scrap purchases. Heavy melting steel scrap has declined 50c. ton, other grades being unchanged. November scrap lists from automobile manufacturers are rather small. The New York Central and the Erie railroads will take bids for unstated tonnages Nov. 2.

Demand Continues to Fall in New York District



Rail Tonnages Awaited Following Two Consecutive Price Reductions—Advance in Tin Plate Expected

NEW YORK, Oct. 30.—Demand for finished steel continues to fall off. Specifications for bars, plates and shapes, on which buyers were permitted to cover for the fourth quarter prior to recent advances, have been better than releases on sheets and strip steel. Business in tin plate is still in good volume, although not up to the level of a few weeks ago. An advance in tin plate, effective the first of the year, will probably be announced by the middle of November.

Rail business is now awaited, following price reductions to \$36.37½ a gross ton, mill. Public works remain the only other outlet for steel that is expanding. Bids will close Nov. 16 on towers for the Triborough bridge in New York, requiring 12,000 tons of steel. Tenders will be taken Nov. 28 on nine cutters for the Coast Guard, requiring a round tonnage of steel. Figures will be taken on four additional Coast Guard cutters at a later date. One thousand tons of plates have been purchased for turbines to be installed at Boulder Dam.

Pig Iron

Shipments have been virtually completed against old low-price contracts, and releases on recent contracts have declined slightly in sympathy with reduced foundry melt. Buyers are stocked sufficiently to cover needs through the rest of the year, and are disposed to limit purchases to carlots to cover weekly stock decreases. Sales during the past week approximated 3000 tons, of which about half is for immediate shipment and the remainder scattered throughout the year. Sales last week totaled 2600 tons, compared with 4000 tons booked a fortnight ago. Current inquiry is entirely limited to scattered small lots, and foundries apparently expect no difficulty in buying in first quarter supplies at present quotations if contract prices should rise on Dec. 1.

Reinforcing Steel

During the week awards of road mesh and rail steel mats aggregated over 900 tons for additional highway construction in New York. Pending awards include 1800 tons for highways and structures in New Jersey for which bids will be opened on Nov. 13, and 700 tons required by the Manhattan west side elevated highway,

announcement of which will be made Nov. 3. Despite the negligible demand for billet and rail steel reinforcing bars, sellers are holding quotations firmly at respective published price levels of 1.75c. a lb., cut lengths, and 1.80c., stock lengths, Pittsburgh base.

Scrap

Brokers are daily expanding foreign bookings as prices become more

Pig Iron Shipments Decline at St. Louis

ST. LOUIS, Oct. 31.—Shipments of pig iron have fallen off considerably during the last two weeks, with the result that October will show a marked decline in the movement from makers. Buying has been light, and no material increase is expected during the remainder of the year. Reports of foundry operations show a decline in the melt. Buyers of castings bought heavily in anticipation of higher prices and are now waiting for more orders. Prices continue firm.

Effective tomorrow, the price of sheet piling advances \$2 a ton to 2.10c a lb., f.o.b. Chicago. October was a quiet month in nearly all lines of finished steel because most buyers bought before price rises became effective. Taking of bids for the Kansas City Municipal Auditorium, requiring 6000 tons of structural steel, have been indefinitely postponed from Nov. 6.

Scrap is considerably weaker, with prices lower on most items. It is stated that no mill in the St. Louis industrial district is in the market for material, because of a lack of orders for finished products. Offerings of scrap have been very small, and dealers say that present low prices will retard the flow of scrap into the district. Selected heavy steel, No. 2 heavy melting, No. 1 locomotive tires, miscellaneous standard-section rails, railroad springs, cast iron car wheels, railroad malleable and stove plate are 50c a ton lower; No. 1 heavy melt-

advantageous with increasing inflationary trends in foreign exchanges. Japan is taking occasional tonnages of scrap rails, but, as with Italy, the major trading is in No. 1 heavy melting steel. In addition, the recent strength of the zloty is opening up greater Polish markets. Daily loadings are being made for export at firm prices of \$7.50 and \$6.50 a ton, barge, for No. 1 and No. 2 heavy melting steel respectively, and, for the first time in several months, No. 1 is being bought in Philadelphia at \$9 to \$9.50, barge. It is estimated that current shipments from all ports exceed domestic melt. Domestic mills are showing no inclination to resume releases against contracts, and local activity is confined to moderate loadings of cast grades for a Phillipsburg, N. J., melter. Scrap is apparently plentiful at present price levels, but it is merely a matter of time when the domestic market will react to the rise in foreign demand. Present price firmness is a direct result of additional foreign bookings.

ing, No. 2 railroad wrought and rails for rolling are 75c a ton lower; steel angle bars are \$1 off, and steel car axles, \$1.50 less than last week.

More Public Work Comes Out on the Coast

SAN FRANCISCO, Oct. 30.—Federal projects constituted the major part of the inquiries reported during the week. The Bureau of Reclamation will take bids at Denver on eight drum gates requiring approximately 1000 tons of structural steel. Government hangars at Hamilton Field and at Coco Solo call for 300 tons of reinforcing bars and 850 tons of structural steel respectively.

It is reported that new bids will be taken Nov. 29 for a torpedo storage building at Pearl Harbor. This project calls for 150 tons of structural steel and 250 to 400 tons of reinforcing bars.

With bids being taken on the Federal building at San Francisco, there are indications that action may be taken soon on post offices for which plans have been completed. Those listed as pending would require a minimum of 15,450 tons of structural steel and 1243 tons of reinforcing bars.

Tonnages awarded during the week, aggregating 507 tons of structural steel and 243 tons of reinforcing bars, were less than for any other week of the year. Government projects increased the totals on new inquiries to 2106 tons of structural and 1238 tons of reinforcing. Private construction appears to be at a minimum.

Fabricated Structural Steel

Awards Again Higher—New Projects Decline

LETTINGS of 16,450 tons of structural steel compare with 13,100 tons a week ago. Bookings for public works, totaling 14,700 tons, again account for the bulk of the awards. New projects of 11,230 tons compare with 27,500 tons in the previous week and 6750 tons two weeks ago. The largest new job reported is 1200 tons for a contemplated extension to the Seventh Street viaduct in Kansas City, Mo. Contracts in October totaled 55,900 tons, compared with 33,752 tons in September and 61,600 tons in August. Structural steel lettings for the week follow:

NORTH ATLANTIC STATES

Windsorville, Conn., 200 tons, building, to Berlin Construction Co.
 Otsego County, N. Y., 330 tons, bridge, to American Bridge Co.
 Warren County, N. Y., 160 tons, bridge to Fort Pitt Bridge Works Co.
 Jamaica, N. Y., 430 tons, Spear & Co. building, to Harris Structural Steel Co.
 Little Falls, N. Y., 165 tons, State highway bridge, to American Bridge Co.
 Erwins, N. Y., 230 tons, State highway bridge, to McClintic-Marshall Corp.
 Willard, N. Y., 150 tons, State power house, to Bethlehem Fabricators, Inc.
 Saranac Lake, N. Y., 140 tons, State highway bridge, to Lackawanna Steel Construction Corp.
 Lyons, N. Y., 175 tons, distillery building, to McClintic-Marshall Corp.
 Kew Gardens, N. Y., 115 tons, Inter-Borough Parkway bridge, to McClintic-Marshall Corp.
 Flemington, N. J., 175 tons, distillery buildings, to McClintic-Marshall Corp.
 State of New Jersey, 120 tons, highway bridge on route 5 at Morris Plains, to McClintic-Marshall Corp.
 Jersey City, N. J., 115 tons, Colgate-Palmolive-Peet-Co. building, to Maxwell Spiro Co.
 Buffalo, 200 tons, sheet piling, bulkhead for Coast Guard station, to a local bidder.
 Lackawanna, N. Y., 140 tons, highway bridge, to Buffalo Structural Steel Company.

SOUTH AND SOUTHWEST

Apple Grove, W. Va., 2350 tons, locks, to Dravo Contracting Co.
 State of Mississippi, 950 tons, State highway bridge, to Stupp Brothers Bridge & Iron Co.
 Clayton, N. Mex., 115 tons, State highway bridge, to American Bridge Co.
 High Island, Tex., 225 tons, bridge, to Virginia Bridge & Iron Co.
 Lake City, Ark., 770 tons, St. Francis River bridge, to Vincennes Bridge Co.
 State of Arizona, 126 tons, highway work, to an unnamed bidder.

CENTRAL STATES

Trumbull County, Ohio, 565 tons, bridge, to Mount Vernon Bridge Co.
 Nobelsville, Ind., 210 tons, State highway bridge, to Vincennes Bridge Co.
 Liberty, Ind., 300 tons, State highway bridge, to Pan-American Bridge Co.
 Chicago, 150 tons, Wilson & Bennett Co., to Wendnagel & Co.
 Alma, Wis., 3500 tons, previously reported as 2500 tons, dam and locks, to McClintic-Marshall Corp.
 Alma, Wis., 2400 tons, piling, previously reported as 1000 tons, dam and locks, to Bethlehem Steel Co.
 Fountain City, Wis., 1675 tons, piling for locks and dam, to Carnegie, Bethlehem, Inland and Jones & Laughlin companies.

Fountain City, Wis., 2500 tons, dam and locks, to Worden-Allen Co.

Appleton, Wis., 125 tons, building, to Milwaukee Bridge Co.

State of Wisconsin, 150 tons, Yellow River bridge, to Wausau Iron Works.

Springfield, Mo., 105 tons, railroad bridge spans, to Stupp Brothers Bridge & Iron Co.

Lincoln and Fairbury Counties, Neb., 205 tons, bridges, to St. Joseph Structural Steel Co.

Cloquet, Minn., 300 tons, State highway bridge, to McClintic-Marshall Corp.

Minneapolis, Minn., 2720 tons, Dam No. 5, to Worden-Allen Co.

WESTERN STATES

San Francisco, 360 tons, inspection bridge on Trans-Bay bridge, to Columbia Steel Co.

Bakersfield, Cal., 175 tons, bridge, to Minneapolis-Moline Power Implement Co.

State of California, 162 tons, Oil Junction Bridge, to Minneapolis-Moline Power Implement Co.

Alaska, 300 tons, highway bridge, Department of Interior, to Wallace Bridge & Structural Co., Seattle.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Woolwich, Me., 350 tons, State bridge.
 Ellsworth, Me., 100 tons, city hall and fire station.
 Avon, N. Y., 450 tons, State highway bridge.
 Roslyn, N. Y., 150 tons, State highway bridge.
 State of New York, 460 tons, State highway bridges.
 Pennsylvania Railroad, 850 tons, grade separation at East Aurora, N. Y.
 New York, 12,500 tons, towers and anchorage cable bents for Tri-Borough Bridge Authority; bids Nov. 16.
 Long Island Railroad, 180 tons, grade separation at Forest Park, N. Y.
 Lake Denmark, N. J., 160 tons, magazine and shell house for United States Ordnance Department.

Philadelphia, 150 tons, apartments for Junata Housing Corp.

Taylor, Pa., 300 tons, Main Street bridge.

Washington, 200 tons, contagious ward for Gallinger Municipal Hospital.

Baltimore, 350 tons, State tobacco warehouse.

THE SOUTH

St. Petersburg, Fla., 200 tons, Navy seaplane hangar.

New Orleans, 400 tons, tainter gates.

Sagerton, Tex., 400 tons, bridge.

Alto, Tex., 330 tons, highway bridge.

CENTRAL STATES

Cleveland, 140 tons, building for Producers Milk Co.

Fargo, N. D., 400 tons, sewage disposal plant.

State of Wisconsin, 550 tons, Wrightstown bridge; bids close Nov. 9.

Joplin, Mo., 250 tons, brewery.

Kansas City, Mo., 1200 tons, contemplated extension of Seventh Street viaduct.

State of Minnesota, 740 tons, highway bridge.

WESTERN STATES

State of Montana, 280 tons, highway bridges.

Miles City, Mont., 180 tons, highway bridge.

Boulder Dam, Nev., 1000 tons, eight drum gates, Spec. No. 548, bids Nov. 15.

Los Angeles, 458 tons, Soto Street bridge over Ramona Boulevard, McClintic-Marshall Corp., low bidder.

CANAL ZONE

Coco Solo, 850 tons, hangar, bids Nov. 22.

HAWAII

Pearl Harbor, 150 tons, torpedo storage building, Specifications No. 7074; bids Nov. 29.

FABRICATED PLATE

AWARDS

Trona, Cal., 400 tons, tanks for American Potash & Chemical Corp., to an unnamed bidder.

Structural Code Meets Violent Labor Attack

WASHINGTON, Oct. 31.—Accompanied by violent objections to its labor provisions by union leaders, the code of fair competition for the structural steel and iron fabricating industry was given a public hearing here yesterday before Deputy Administrator Barton W. Murray of the NRA. Union objections to the wage provisions of the code were based principally upon a desire to provide separate codes for the erecting and fabricating industries, on the assumption that the presented code was promulgated by the steel industry which is opposed to union recognition. The American Institute of Steel Construction, which submitted the code and represents a large percentage of the industry, has promised to supply data to the Government showing that its members do at least 80 per cent of the steel erection work in the country, as well as the fabricating. No major changes were made in the code and its acceptance is expected. It was published in full in THE IRON AGE of Sept. 14, p. 28.

Detroit Scrap Prices Still Sinking

DETROIT, Oct. 31.—Scrap prices have continued to recede as demand from all classes of consumers has shrunk. Most steel items, including heavy melting steel and hydraulic compressed sheets, have dropped 25c. a ton and No. 2 busheling is off 50c. Although the volume of scrap now being produced in this district is extremely light, it is more than adequate to meet current needs.

Copper, Lead and Zinc Swing to Firmer Levels as Consumers Cover Future Needs

Sales of Spelter at 4.75c. Approximate 3500 Tons—Copper Industry Awaits Code Action—Spot Straits Advances to 49c.

NEW YORK, Oct. 31.—Bookings of over 6000 tons of electrolytic copper were made during the past week, but activity has contracted sharply and buyers are ignoring present offerings since nearby requirements are very well covered. Mine producers are inactive at the 9c. position, and current trading is limited to scattered consumer carloads and speculative parcels at a firm price level of 8.25c. a lb., delivered Connecticut points. The interest of the trade is centered on Washington where Deputy Administrator King is attempting to obtain a code agreement from mine producers and custom smelters. It is expected that maximum and minimum market prices may be established, but no favorable action is expected on the recent petition of Butte miners, recommending the restriction of scrap flow through custom plants. Domestic bids for scrap exceed those pre-

vailing abroad, thereby preventing the flow of scrap to Europe, but dealers are disposed to withhold accumulations since they expect stronger quotations to prevail. The recently arrived Katanga representative states that Continental sales of 50,000 to 55,000 tons a month are considered satisfactory, and scouts the possibility of a copper cartel. Recent trading abroad has been moderate at prices ranging from 7.90c. to 8c. a lb., c.i.f. usual Continental ports.

Tin

Advances in London and stronger sterling carried spot Straits 60 points upward during the week to today's level of 49c. a lb., New York. Higher prices and the difficulty of securing firm bids is discouraging prospective buyers, and trading is practically at a standstill. Despite low consumer interest abroad, quotations advanced

during the week, and postings on first call today were £229 10s. for Spot Straits, £224 10s. for spot and £224 5s. for future standard. Consumer indifference is more than offset by an excellent statistical position, and the world market undertone is decidedly steady.

Lead

During the seven-day period, quotations advanced \$5 a ton, and all types of users hastened to cover estimated requirements at prices ranging from 4c. to 4.30c. a lb., New York. Desirable business contracted sharply on Friday, and current trading is confined to scattered carlots at a firm price level of 4.30c. a lb., New York, and 4.15c., St. Louis. The rebounding prices, directly influenced by inflationary trends, forced in the bookings that producers had desired, and spirited buying in the November position succeeded in covering that month more than 90 per cent. The December position is currently receiving negligible attention. In sympathy with the stronger position of all commodities and the present domestic parity of import pig lead of 4.65c., New York, prices are not expected to soften in the near future.

Zinc

Offerings of spelter at shaded price levels were rapidly withdrawn from the market as the basic strength of other metals increased. The recent firming of quotations forced in diversified purchasing, and sales of Prime Western during the week totaled 3500 tons. Most of the metal was sold at 4.75c., but several lots were disposed of at 4.70c., whereas, during the latter part of the week, positions into December were booked at a firm price level of 4.80c. a lb., East St. Louis, or 5.10c., New York. Inquiry is light, and open buying is currently in very low volume. The price for spot metal, however, is strong at 4.75c., East St. Louis, on the strength of an improved Tri-State ore position. Joplin mines are apparently succeeding in efforts to curtail production, and the week's 1300-ton decline to 5300 tons steadied the price of concentrates at \$31 a ton. It is expected that additional reductions will contract the weekly output to 4000 tons. Shipments for the week approximated 4950 tons, and stocked supplies are estimated at 10,250 tons.

The Week's Prices. Cents Per Pound for Early Delivery

	Oct. 25	Oct. 26	Oct. 27	Oct. 28	Oct. 30	Oct. 31
Electrolytic copper, N. Y.*.....	8.00	8.00	8.00	8.00	8.00	8.00
Lake copper, New York.....	8.25	8.25	8.25	8.25	8.25	8.25
Straits tin, Spot, N. Y.....	48.75	48.62½	48.37½	...	48.87½	49.00
Zinc, East St. Louis.....	4.75	4.75	4.75	4.75	4.75	4.75
Zinc, New York.....	5.10	5.10	5.10	5.10	5.10	5.10
Lead, St. Louis.....	4.05	4.15	4.15	4.15	4.15	4.15
Lead, New York.....	4.15	4.30	4.30	4.30	4.30	4.30

*Refinery quotations; price ¼c. higher delivered in Connecticut.
Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 6.70c. a lb., New York.
Brass ingots, 85-5-5-5, 8.75c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.	
Tin, Straits pig.....	50.50c. to 51.50c.
Tin, bar.....	52.50c. to 53.50c.
Copper, Lake.....	9.25c. to 10.00c.
Copper, electrolytic.....	9.00c. to 9.50c.
Copper, castings.....	8.75c. to 9.75c.
*Copper sheets, hot-rolled.....	17.12½c.
*High brass sheets.....	14.75c.
*Seamless brass tubes.....	16.37½c.
*Seamless copper tubes.....	16.62½c.
*Brass rods.....	12.25c.
Zinc, slabs.....	6.00c. to 7.00c.
Zinc sheets (No. 9), casks.....	9.75c. to 10.00c.
Lead, American pig.....	5.12½c. to 6.12½c.
Lead, bar.....	6.12½c. to 7.12½c.
Lead, sheets.....	8.00c.
Antimony, Asiatic.....	8.50c. to 9.50c.
Alum., virgin, 99 per cent plus.....	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent.....	18.00c. to 19.00c.
Solder, ½ and ½.....	30.00c. to 31.00c.
Babbitt metal, commercial grade.....	25.00c. to 50.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.	
Tin, Straits pig.....	52.75c.
Tin, bar.....	54.75c.

Copper, Lake.....	9.50c. to 9.625c.
Copper, electrolytic.....	9.50c. to 9.625c.
Copper, castings.....	9.25c.
Zinc, slab.....	5.75c. to 6.00c.
Lead, American pig.....	5.00c. to 5.25c.
Lead, bar.....	8.00c.
Antimony, Asiatic.....	9.00c.
Babbitt metal, medium grade.....	19.50c.
Babbitt metal, high grade.....	58.25c.
Solder, ½ and ½.....	31.25c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	5.75c.	7.50c.
Copper, hvy. and wire.....	5.75c.	7.25c.
Copper, light and bottoms.....	5.00c.	5.75c.
Brass, heavy.....	3.50c.	4.00c.
Brass, light.....	3.00c.	3.50c.
Hvy. machine composition.....	4.50c.	5.25c.
No. 1 yel. brass turnings.....	4.25c.	5.00c.
No. 1 red brass or compos. turnings.....	4.00c.	4.75c.
Lead, heavy.....	3.25c.	3.625c.
Zinc.....	2.75c.	3.25c.
Cast aluminum.....	7.25c.	8.50c.
Sheet aluminum.....	11.25c.	12.75c.

Non-Ferrous Averages

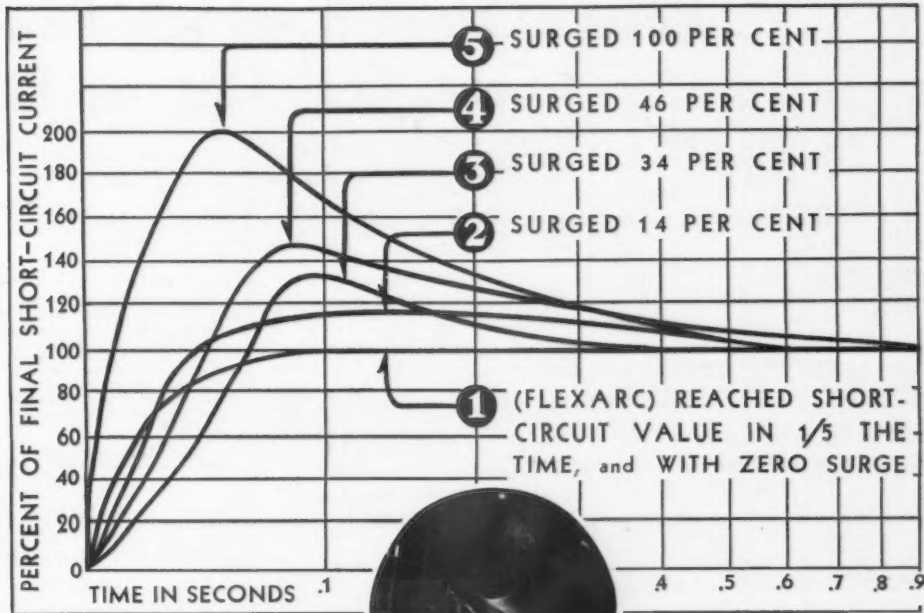
The average prices of the major non-ferrous metals for October, based on daily quotations in THE IRON AGE, are as follows:

	Average
Electrolytic copper, N. Y.*..	8.075c. a lb.
Lake copper, New York.....	8.408c. a lb.
Straits tin, Spot, N. Y.....	47.752c. a lb.
Zinc, East St. Louis.....	4.750c. a lb.
Zinc, New York.....	5.100c. a lb.
Lead, St. Louis.....	4.208c. a lb.
Lead, New York.....	4.346c. a lb.

*Refinery quotations; price ¼c. higher delivered in Connecticut.

These oscillograph curves show how the welding circuits of different welders react to short-circuits in the arc stream. Note the non-surge line of FlexArc—how quickly it reaches short-circuit value, without a surge.

THE FLEXARC



NON-SURGE ARC

ASSURES A DENSER BEAD

A WELD is dense or porous . . . depending upon whether it is produced by a uniform or an explosive arc heat. Before you invest in a welding machine, make sure that its power will not surge or "hump."

The oscillograph curves shown above record how five well-known welding machines reacted under test to "shorts" in the arc stream. Note the complete absence of current surges in the power produced by the Westinghouse FlexArc Welder.

This uniformity of welding current means not only denser welds . . . it assures extreme ease and speed of metal deposit. Whether you make horizontal, vertical or overhead welds . . . at 50 or 800 amperes . . . with bare or coated electrodes, FlexArc Welders will give you more ounces of active weld metal per minute and per watt of electric current consumed than any other type of arc welding machine.

The coupon will bring you a 20-page booklet containing facts about Westinghouse FlexArc welders. Simply mail the coupon for your copy.

Westinghouse ARC WELDERS

Quality workmanship guarantees every Westinghouse product



FREE BOOKLET

Westinghouse Electric & Mfg. Company
Room 2-N—East Pittsburgh, Pa.

Gentlemen:

Please send me your 20-page booklet on FlexArc Welders.

Name

Position

Company.....T 79786

AddressIA 11-2-33

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES Iron and Steel Bars

Soft Steel	Base per Lb.
F.o.b. Pittsburgh mill	1.75c.
F.o.b. Chicago or Gary	1.80c.
Del'd Philadelphia	2.04c.
Del'd New York	2.08c.
F.o.b. Cleveland	1.80c.
F.o.b. Buffalo	1.85c.
F.o.b. Birmingham	1.90c.
F.o.b. cars dock	1.90c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific	2.35c.
Rail Steel	
(For merchant trade)	
F.o.b. Cleveland	1.70c.
F.o.b. Chicago	1.70c.
F.o.b. Gary	1.70c.
F.o.b. Pittsburgh	1.65c.
F.o.b. Buffalo	1.75c.
F.o.b. Birmingham	1.80c.

Billit Steel Reinforcing

(Stock lengths as quoted by distributors; cutting to length, 60 in. and over takes extra of 10c. per 100 lb.)	
F.o.b. P'gh mills	1.80c.
F.o.b. Birmingham	1.85c.
F.o.b. Buffalo	1.85c.
F.o.b. Cleveland	1.85c.
F.o.b. Youngstown	1.85c.
F.o.b. Chicago or Gary	1.85c.
F.o.b. cars dock Pacific ports	2.35c.
F.o.b. cars dock Gulf ports	2.30c.

Rail Steel Reinforcing

(Cut lengths as quoted by distributors)	
F.o.b. Pittsburgh	1.75c.
F.o.b. Cleveland	1.80c.
F.o.b. Chicago	1.80c.

Iron

Common iron, f.o.b. Chicago	1.60c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Phila.	1.74c.
Common iron del'd New York	1.90c.

Steel Car Axles

F.o.b. Pittsburgh	2.50c.
F.o.b. Chicago	2.50c.

Tank Plates

Rank Plates	Base per Lb.
F.o.b. Pittsburgh mill.....	1.70c.
F.o.b. Chicago.....	1.75c.
F.o.b. Gary.....	1.75c.
F.o.b. Birmingham.....	1.85c.
Del'd Cleveland.....	1.85c.
Del'd Philadelphia.....	1.85c.
F.o.b. Coatesville.....	1.80c.
F.o.b. Sparrows Point.....	1.80c.
Del'd New York.....	1.95c.
F.o.b. dock cars Pacific ports.....	2.25c.
F.o.b. cars dock, Gulf ports.....	2.10c.
Wrought iron plates, f.o.b. P'gh.....	3.00c.

Flower Plates

F.o.b. Pittsburgh	3.20c.
F.o.b. Chicago	3.25c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Birmingham	1.85c.
F.o.b. Buffalo	1.80c.
F.o.b. Bethlehem	1.80c.
Del'd Cleveland	1.85c.
Del'd Philadelphia	1.90c.
Del'd New York	1.95c.
F.o.b. cars dock, Gulf ports	2.10c.
F.o.b. cars dock Pacific ports (stand- ard)	2.25c.
F.o.b. cars dock Pacific ports (wide flange)	2.35c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.00c.
F.o.b. Chicago mill	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports.....	2.45c.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Beth- lehem, Massillon or Canton, Open-hearth grade, base, 2.45c. a lb. ex- cept at Bethlehem where the price is 2.55c. S.A.E.	
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Series	Alloy	Differential
Numbers	per 100 Lb.	
2000 (1% Nickel)		\$0.25
2100 (2 1/4% Nickel)		0.55
2300 (3 1/4% Nickel)		1.50
2500 (5% Nickel)		2.25
3100 Nickel Chromium		0.55
3200 Nickel Chromium		1.35
3300 Nickel Chromium		3.80
3400 Nickel Chromium		3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)		0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)		0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)		1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)		0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)		0.45
5100 Chromium Spring Steel		base
6100 Chromium Vanadium Bar		1.20
4100 Chromium Vanadium Spring Steel		0.95
Chromium Nickel Vanadium		1.50
Carbon Vanadium		0.95

Above prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The

differential for cold-drawn bars is 1/4c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Cold Finished Bars*

Bars, f.o.b. Pittsburgh mill	1.95c.
Bars, f.o.b. Chicago	2c.
Bars, Cleveland	2c.
Bars, Buffalo	2c.
Bars, Detroit	2.15c.
Bars, eastern Michigan	2.20c.
Shafting, ground, f.o.b. mill	
1 1/4 in.	3.25c.
1-3/16 to 1 1/2 in.	2.75c.
1-9/16 to 1 7/8 in.	2.60c.
1-15/16 to 2 1/4 in.	2.45c.
2-15/16 to 6 in.	2.30c.

* In quantities of 10,000 to 19,999 lb.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

No. 10, f.o.b. Pittsburgh	1.75c.
No. 10, f.o.b. Gary	1.85c.
No. 10, del'd Phila.	2.04c.
No. 10, f.o.b. Birmingham	1.90c.
No. 10, f.o.b. dock cars Pacific	2.42 1/2 c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.25c.
No. 24, f.o.b. Gary	2.35c.
No. 24, del'd Phila.	2.54c.
No. 24, f.o.b. Birmingham	2.40c.
No. 24, f.o.b. dock cars Pacific	2.95c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.30c.
No. 10 gage, f.o.b. Gary	2.40c.
No. 10 gage, del'd Phila.	2.59c.
No. 10 gage, f.o.b. dock cars Pacific	3.00c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.75c.
No. 20 gage, f.o.b. Gary	2.85c.
No. 20 gage, del'd Phila.	2.94c.
No. 20 gage, f.o.b. dock cars Pacific	4.45c.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Gary	2.95c.
No. 24, del'd Phila.	3.14c.
No. 24, f.o.b. Birmingham	3.00c.
No. 24, f.o.b. dock cars Pacific	3.55c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Terne

No. 24, unassorted 8-lb. coating	2.90c.
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Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	2.90c.
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Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.50c.
No. 28, Gary	2.60c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mill	\$4.65
Standard cokes f.o.b. Gary	4.75

Terne Plate

Terne Plate	
(F.o.b. Pittsburgh)	
(Per Package, 20 x 28 in.)	
8-lb. coating I.C.	\$8.70
15-lb. coating I.C.	11.00
20-lb. coating I.C.	11.90
25-lb. coating I.C.	13.00
30-lb. coating I.C.	13.80
40-lb. coating I.C.	15.30
Hot-Rolled Hoops, Bands, Strips and Flats under 3/4 In.	

Hot-Rolled Hoops, Bands, Strips and

Plats under 1/4 in.

All widths up to 24 in., Chicago ..	1.85c
Cooperage stock, Pittsburgh	1.85c
Cooperage stock, Chicago	1.95c

Cold-Rolled Strips

F.o.b. Pittsburgh	2.40c.
F.o.b. Cleveland	2.40c.
Del'd Chicago	2.68c.
F.o.b. Worcester	2.60c.

Fender Stock

No. 20, Pittsburgh or Cleveland	3.10c.
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WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleve- land.)	
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To Manufacturing Trade

	Per Lb
Bright wire	2.10c
Spring wire	3.10c

To Jobbing Trade

Extras of 10c. a 100 lb. on joint carloads and 30c. on pooled cars and less-than-carload lots are applied on all merchant wire products. An allowance of \$2 a ton is made to jobbers on straight, mixed or joint carloads; \$3 a ton is allowed on less-than-carload shipments.

	Base per Keg
Standard wire nails	\$2.10
Smooth coated nails	2.10
Galvanized nails	3.60

	Base per 100 Lb.
Smooth annealed wire	\$2.25
Smooth galvanized wire	2.60
Polished staples	2.80
Galvanized staples	3.05
Barbed wire, galvanized	2.60
Woven wire fence, base column ...	55.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are \$3 a ton over Pittsburgh (except for woven wire fence at Duluth which is \$5 over Pittsburgh), and Birmingham mill prices are \$3 a ton over Pittsburgh.

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh
District and Lorain, Ohio Mills

Butt Weld

Inches	Steel	Black Galv.	Inches	Wrought Iron	Black Galv.
1/4	51 1/4	29 1/4	1 1/4	41 1/4	28
3/8	57	38 1/4	1 1/2	43 1/4	28
1/2	62	50 1/4	1 3/4	43 1/4	28
3/4	65 1/4	53 1/4	1 7/8	43 1/4	28
1	67 1/4	55 1/4	2	41 1/4	26

Lap Weld

2	63 1/4	54 1/4	2 1/2	37	22 1/2
2 1/2	66 1/4	57 1/4	3	34 1/4	25
3	68 1/4	59 1/4	4	34 1/4	25
4	67 1/4	57 1/4	6	34 1/4	25
7 and 8	67 1/4	57 1/4	9 to 12	38	24 1/2
9 and 10	67	57			
11 and 12	66	56			

Butt Weld, extra strong, plain ends					
1/4	.....	48 1/2	33 1/2	1/4	... + 13 + 45 1/2
3/4 to 3/8	.....	54 1/2	41 1/2	1/2 & 3/4	+ 2 1/2 + 34 1/2
1/2	.....	60	51	1 1/2	..... 32 1/2 17 1/2
3/8	.....	64 1/2	55 1/2	2 1/2	..... 37 1/2 22 1/2
1 to 3	.....	66 1/2	58 1/2	1 to 2	..... 43 1/2 29

Lap Weld, extra strong, plain ends					
2	61 1/4	53 1/4	2 1/2	40	26
2 1/2	65 1/4	57 1/4	3	45 1/4	33
3 1/2	69	61	4 1/2	6 45	32 1/4
7 and 8	68	58	7 & 8	46	33
9 and 10	67	57	9 to 12	41 1/4	30

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2 1/4	33	1 1/4 in.	1
2 1/4 in.—2 3/4 in.	40	1 3/4 in.	8
3 in.	47	2 in.—2 1/4 in.	13
3 1/4 in.—4 in.	50	2 1/4 in.—2 3/4 in.	16
4 in.	52	3 in.	17
4 1/4 in. to 6 in.	43	3 1/4 in. to 3 1/2	18
		4 in.	21
		4 1/4 in.	22

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lan welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler

Standard Commercial Seamless Boiler Tubes			
Cold-Drawn			
1 in.	61	3 in.	41
1 1/4 to 1 1/2 in. . .	53	3 1/4 to 3 1/2 in. . .	44
1 1/2 in.	37	4 in.	46
2 to 2 1/4 in.	27	4 1/4, 5 and 6 in. . .	36

Hot-Rolled

2 and 2 1/4 in.	33	3 1/4 to 3 1/2 in.	50
2 1/2 and 2 3/4 in.	40	4 in.	52
3 in.	47	4 1/4, 5 and 6 in.	42

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb. base discounts are reduced 6 points with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. in lighter than standard

gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads) 25
Carbon, 0.30% to 0.40% base 50
Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, 60-lb. and heavier,	
per gross ton	\$37.75
Angle bars, per 100 lb.	2.35

F.o.b. Code Basing Points

Light rails (from billets) per gross	
ton	\$32.90
Light rails (from rail steel) per gross	
ton	\$31.90
Base per 100 Lb.	
Spikes, 9/16 in. and larger	\$2.40
Spikes, 1/2 in. and smaller	2.40
Spikes, boat and bark	1.40
Tie plates, steel	1.80
Track bolts, to steam railroads	3.40
Track bolts, to jobbers, all sizes (per 100 count)	70 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birming-
ham or Chicago)

Per Cent Off List

Machine bolts	70
Carriage bolts	70
Hex bolts	70
Flange bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-dressed nuts, blank or tapped,	70
square	70
Hot-dressed nuts, blank or tapped,	70
hexagons	70
C.C. and L. square or hex nuts, blank	70
or tapped	70
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts,	70
S.A.E.	70
Store bolts in packages, P'gh	72 1/2, 25 and 10
Store bolts in packages, Chicago	72 1/2, 25 and 10
Store bolts in packages, Cleveland	72 1/2, 25 and 10
Store bolts in bulk, P'gh	72 1/2, 25 and 10
Store bolts in bulk, Chicago	72 1/2, 25 and 10
Store bolts in bulk, Cleveland	72 1/2, 25 and 10
Tire bolts	70

Large Rivets

(1/2-in. and larger)

(1/2-in. and larger)	
	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland.....	\$2.75
F.o.b. Chicago and Birmingham.....	2.85

Small Rivets

(7/16-in. and smaller)

(7/16-In. and smaller)	
	<i>Per Cent Off List</i>
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago and Birm'g'm....	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

Milled cap screw, 1 in. dia. and smaller	50
Milled standard set screws, case hardened, 1 in. dia. and smaller	50
Milled headless set screws, cut thread 1/2 in. and smaller	75 and 10
Upset hex. head cap screws, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller	85 and 10
Upset set screws, sq. head	90
Milled studs	

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	\$35.00
Cleveland	35.00
Chicago	36.00
Birmingham	38.00
Youngstown (del'd)	36.00

ALLOY STEEL BLOOMS, BILLETS AND SLABS

F.o.b. Pittsburgh, Chicago, Buffalo, Massillon, Canton or Bethlehem.
Base price, \$49 a gross ton except at Bethlehem, where it is \$51.

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville	
Prompt	\$3.75
Foundry, f.o.b. Connellsville	
Prompt	\$4.25 to 5.25
Foundry, by-product, Chicago areas, for delivery outside switching districts	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry, by-product, New England, delivered	10.50
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Philadelphia	8.50
Foundry, by-product, Cleveland, delivered	8.78
Foundry, Birmingham	4.75
Foundry, by-product, St. Louis, f.o.b. ore	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.55 to \$1.80
Mine run coking coal, f.o.b. W. Pa. mines	1.80 to 2.00
Gas coal, 3 $\frac{1}{2}$ -in., f.o.b. Pa. mines	2.00 to 2.30
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.20
Steam slack, f.o.b. W. Pa. mines	1.30 to 1.40
Gas slack, f.o.b. W. Pa. mines	1.65 to 1.85

Fuel Oil

	Per Gal. f.o.b. Bayonne, N. J.
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
	Per Gal. f.o.b. Baltimore
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
	Per Gal. del'd Chicago
No. 3 industrial fuel oil	3.73c.
No. 5 industrial fuel oil	3.23c.
	Per Gal. f.o.b. Cleveland
No. 3 distillate	5.50c.
No. 4 industrial	5.35c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works
High-heat Intermediate Duty Brick	
Pennsylvania	\$45.00
Maryland	45.00
New Jersey	55.00
Ohio	45.00
Kentucky	45.00
Missouri	45.00
Illinois	45.00
Ground fire clay, per ton	7.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$45.00
Chicago	54.00
Birmingham	55.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	\$65.00
Unburned, f.o.b. Baltimore	\$26.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	\$43.00
4-in., del'd Chicago	46.00
4-in., and larger, del'd New York	38.00
4-in., del'd New York	42.00
6-in., and larger, Birmingham	\$35.00 to 36.00
4-in., Birmingham	38.00 to 39.00
Class "A" and gas pipe, \$3 extra.	

Pig Iron, Ores, Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	\$18.00	\$18.50	\$17.50	\$19.00
Bethlehem, Pa.	17.50	18.00	17.00	18.50
Birdsboro, Pa.	17.50	18.00	17.00	18.50
Swedeland, Pa.	17.50	18.00	17.00	18.50
Sparrows Point, Md.	17.50	18.00	17.00	18.50
Neville Island, Pa.	18.00	18.00	17.50	18.50
Shirpsville, Pa.	17.50	17.50	17.00	18.00
Youngstown	17.50	17.50	17.00	18.00
Buffalo	17.50	18.00	16.50	18.50
Erie, Pa.	17.50	18.00	17.00	18.50
Cleveland	17.50	17.50	17.00	18.00
Toledo, Ohio	17.50	17.50	17.00	18.00
Detroit	17.50	17.50	17.00	18.00
Hamilton, Ohio	17.50	17.50	17.00	18.00
Chicago	17.50	17.50	17.00	18.00
Granite City, Ill.	17.50	18.00	17.00	18.50
Duluth, Minn.	18.00	18.00	17.00	18.00
Birmingham	13.50	18.00	17.00	18.50
Provo, Utah	16.50	18.00	17.00	18.50

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston and nearby New England	\$18.50	\$19.00	\$18.00	\$19.50
From Everett, Mass.	18.50	19.00	18.00	19.50
From Buffalo	19.77	20.27	19.27	20.77
From East. Pa. or Buffalo	18.89	19.39	18.39	19.89
Newark or Jersey City, N. J.	18.89	19.39	18.39	19.89
From East. Pa. or Buffalo	18.89	19.39	18.39	19.89
Philadelphia	18.26	18.76	17.76	19.26
From Eastern Pa.	18.26	18.76	17.76	19.26
Cincinnati	18.51	18.51	18.01	19.01
From Hamilton, Ohio	18.51	18.51	18.01	19.01
Canton, Ohio	18.76	18.76	18.76	19.76
From Cleveland and Youngstown	18.76	18.76	18.76	19.76
Columbus, Ohio	19.50	19.50	19.50	20.50
From Hamilton, Ohio	19.50	19.50	19.50	20.50
Mansfield, Ohio	19.26	19.26	19.26	20.26
From Cleveland and Toledo	19.26	19.26	19.26	20.26
Indianapolis	19.77	19.77	19.77	20.77
From Hamilton, Ohio	19.77	19.77	19.77	20.77
South Bend, Ind.	19.55	19.55	19.55	20.55
From Chicago	19.55	19.55	19.55	20.55
Milwaukee	18.50	18.50	18.50	19.50
From Chicago	18.50	18.50	18.50	19.50
St. Paul	19.44	19.44	19.44	20.44
From Duluth	19.44	19.44	19.44	20.44
Davenport, Iowa	19.26	19.26	19.26	20.26
From Chicago	19.26	19.26	19.26	20.26
Kansas City	20.04	20.04	20.04	21.04
From Granite City	20.04	20.04	20.04	21.04

Delivered prices on Southern iron for shipment to Northern points are 33c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	\$22.00
Johnson City, Tenn.	22.00
F.o.b. Valley furnace	22.00
Del'd Chicago	27.65

GRAY FORCE PIG IRON

Valley furnace	\$17.50
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CHARCOAL PIG IRON

Lake Superior furnace	\$20.50
Delivered Chicago	23.54
Delivered Buffalo	23.78

CANADA

Pig Iron

Per gross ton:	
Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	21.00
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard, (carload)	\$82.00
Domestic, 80%, seaboard, (less carloads)	89.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	\$27.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	\$74.50
50% (less carloads)	82.00
75% (carloads)	120.00
75% (less carloads)	130.00
11% to 16% (f.o.b.) Welland	31.00
Ont. (in carloads)	36.00
11% to 16% (less carloads)	36.00

Silvery Iron

F.o.b. Jackson, Ohio, Furnace			
Per Gross Ton		Per Gross Ton	
6%	.....\$22.25	12%	.....\$29.25
7%	.....23.25	13%	.....30.75
8%	.....24.25	14%	.....32.25
9%	.....25.25	15%	.....33.75
10%	.....26.25	16%	.....35.25
11%	.....27.75	17%	.....36.75

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace			
Per Gross Ton		Per Gross Ton	
10%	.....\$27.25	14%	.....\$33.25
11%	..... 28.75	15%	..... 34.75
12%	..... 30.25	16%	..... 36.25
13%	..... 31.75	17%	..... 37.75

Manganese 1½ to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Manganese 1 $\frac{1}{2}$ to 3%. \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Other Ferroalloys

Ferrotungsten, per lb. wo. del., carloads	94c.
Ferrotungsten, less carloads	\$1.00
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	\$9.50c.
Ferrochromium, 2% carbon	16.50 to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	\$11.50 to \$12.00
No. 2 heavy melting steel	10.50 to 11.00
No. 2 railroad wrought	11.50 to 12.00
Scrap rails	11.50 to 12.00
Rails 3 ft. and under	14.50 to 15.00
Sheet car crops, ordinary	13.00 to 13.50
Compressed sheet steel	11.50 to 12.00
Hand bundled sheet steel	10.75 to 11.25
Hvy. steel axle turnings	10.50 to 11.00
Machine shop turnings	9.00 to 9.50
Short short, steel turnings	9.00 to 9.50
Short mixed borings and turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Cast iron wheels	11.00 to 11.50
Heavy breakable cast	10.50 to 11.00
No. 1 cast	11.50 to 12.00
Rail, knuckles and couplers	13.50 to 14.00
Rail, coil and leaf springs	13.50 to 14.00
Roller steel wheels	13.50 to 14.00
Low phos. billet crops	15.00 to 15.50
Low phos. sheet bar crops	14.50 to 15.00
Low phos. plate scrap	14.00 to 14.50
Low phos. punchings	14.50 to 15.00
Steel car axles	14.50 to 15.00

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	\$8.50 to \$9.00
Shoveling steel	8.50 to 9.00

Ferrovandium, del., per lb. contained Va.	\$2.60 to \$2.80
Ferrocobaltitanium, 15 to 18% per cent ton, f.o.b. furnace in carloads	160.00
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with \$2 unitage	50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with \$2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	\$36.00
Ton lots or less, per ton	41.00
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00
Spot prices	\$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range, Bessemer, 51.5% iron	\$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	8c.
Iron, low phos., Swedish, average 68 $\frac{1}{2}$ % iron	8.50c.
Iron, basic or foundry, Swedish, average, 65% iron	8c.
Iron, basic or foundry, Russian, aver. 65% iron (nom.)	8c.
Manganese, Caucasian, washed 52%	22c.
Manganese, African, Indian, 44-48%	20c.
Manganese, African, Indian, 49-51%	21c.
Manganese, Brazilian, 46 to 48 $\frac{1}{2}$ %	17c.

Per Net Ton Unit

Tungsten, Chinese wolframite, duty paid*	\$12.00
Tungsten, domestic scheelite*	\$11.00 to \$12.00
	Per Gross Ton
Chrome, 45%, Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	16.00
Chrome, 48%, Cr ₂ O ₃ , c.i.f. Atlantic seaboard	18.00

*Quotations nominal in absence of sales.

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines	\$15.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	16.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	18.50
Domestic, No. 1 ground bulk, 85 to 98% calcium fluoride, not over 2 $\frac{1}{2}$ % silicon, f.o.b. Illinois and Kentucky mines	30.00

Iron and Steel Scrap

Hydraulic comp. sheets	\$7.25 to \$7.75
Drop forge flashings	6.50 to 7.00
No. 1 busheling	7.00 to 7.50
Roller car wheels	10.50 to 11.00
Railroad tires	10.25 to 10.75
Railroad leaf springs	10.50 to 11.00
Axle turnings	7.50 to 8.00
Steel couplers and knuckles	10.00 to 10.50
Coil springs	11.00 to 11.50
Axle turnings (elec. fur.)	7.50 to 8.00
Low phos. punchings	11.00 to 11.50
Low phos. plates, 12 in. and under	11.00 to 11.50
Cast iron borings	5.50 to 6.00
Short shoveling turnings	5.50 to 6.00
Machine shop turnings	5.00 to 5.50
Revolving rails	10.50 to 11.00
Steel rails, less than 3 ft.	11.00 to 11.50
Steel rails, less than 2 ft.	11.50 to 12.00
Angle bars, steel	10.00 to 10.50
Cast iron car wheels	9.50 to 10.00
Railroad malleable	9.00 to 9.50
Agricultural malleable	7.50 to 8.00

Per Net Ton

Iron car axles	\$12.00 to \$12.50
Steel car axles	9.00 to 9.50
No. 1 railroad wrought	7.75 to 8.25
No. 2 railroad wrought	7.50 to 8.00

No. 2 busheling	\$3.50 to \$4.00
Locomotive tires, smooth	8.50 to 9.00
Pipe and flues	4.25 to 4.75
No. 1 machinery cast	9.00 to 9.50
Clean automobile cast	9.00 to 9.50
No. 1 railroad cast	8.00 to 8.50
No. 1 agricultural cast	8.00 to 8.50
Store plate	6.25 to 6.75
Grate bars	6.00 to 6.50
Brake shoes	8.00 to 8.50

PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$10.00
No. 2 heavy melting steel	\$8.50 to 9.00
No. 1 railroad wrought	11.00
Bundled sheets	8.00 to 8.50
Hydraulic compressed, new	10.00
Hydraulic compressed, old	8.00 to 8.50
Machine shop turnings	6.00 to 6.50
Heavy axle turnings	9.00
Cast borings	7.00
Heavy breakable cast	10.50 to 11.00
Store plate (steel works)	8.50 to 9.00
No. 1 low phos. heavy	13.00 to 14.00
Couplers and knuckles	13.00 to 13.50
Rolled steel wheels	13.00 to 13.50
No. 1 blast furnace	6.00 to 6.50
Spec. iron and steel pipe	9.00 to 9.50
Shafting	14.50 to 15.00
Steel axles	13.50 to 14.00
No. 1 forge fire	10.50
Cast iron car wheels	11.50 to 12.00
No. 1 cast	11.00 to 12.00
Cast borings (chem.)	12.00 to 11.00
Steel rails for rolling	12.00 to 12.50

CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$9.50 to \$10.00
No. 2 heavy melting steel	9.00 to 9.50
Compressed steel	9.00 to 9.50
Light bundled sheet stamp-	
ings	6.50 to 7.00
Drop forge flashings	9.00 to 9.50
Machine shop turnings	7.00 to 7.50
Short shoveling turnings	7.50 to 8.00
No. 1 busheling	9.00 to 9.50
Steel axle turnings	7.50 to 8.00
Low phos. billet crops	12.50 to 13.00
Cast iron borings	7.00 to 7.50
Mixed borings and short	
turnings	7.00 to 7.50
No. 2 busheling	7.00 to 7.50
No. 1 cast	11.00 to 11.50
Railroad grate bars	6.50 to 7.00
Store plate	7.50 to 8.00
Rails under 3 ft.	10.00 to 10.50
Rails for rolling	10.50 to 11.00
Railroad malleable	10.00 to 10.50
Cast iron car wheels	11.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:	
No. 1 heavy melting steel	\$9.00 to \$9.50
No. 2 heavy melting scrap	8.00 to 8.50
Scrap rails	8.50 to 9.00
New hydraulic comp. sheets	8.00 to 8.50
Old hydraulic comp. sheets	7.00 to 7.50
Drop forge flashings	8.00 to 8.50
No. 1 busheling	8.00 to 8.50
Hvy. steel axle turnings	8.50 to 9.00
Machine shop turnings	6.00 to 6.50
Knuckles and couplers	11.00 to 11.50
Coll and leaf springs	11.00 to 11.50
Rolled steel wheels	11.00 to 11.50
Low phos. billet crops	12.50 to 13.00
Short shov. steel turnings	7.00 to 7.50
Short mixed borings and	
turnings	6.00 to 6.50
Cast iron borings	6.00 to 6.50
No. 2 busheling	6.00 to 6.50
Steel car axles	11.00 to 12.00
Iron axles	11.00 to 12.00
No. 1 machinery cast	11.00 to 11.50
No. 1 cupola cast	11.00 to 11.50
Store plate	8.75 to 9.25
Steel rails, 3 ft. and under	12.50 to 13.00
Cast iron car wheels	10.00 to 10.50
Industrial malleable	10.50 to 11.00
Railroad malleable	10.50 to 11.00
Chemical borings	9.00 to 10.00

BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel	\$10.00 to \$10.50
Scrap steel rails	9.00 to 9.50
Short shoveling turnings	5.50
Store plate	7.00 to 7.50
Steel axles	11.00 to 11.50
Iron axles	11.00 to 11.50
No. 1 railroad wrought	7.00
Rails for rolling	10.50
No. 1 cast	10.00 to 10.50
Tramcar wheels	9.50 to 10.00
Cast iron borings, chem.	8.00

ST. LOUIS

Per gross ton delivered consumers' yards:	
Selected heavy steel	\$8.75 to \$9.25
No. 1 heavy melting	7.75 to 8.25
No. 2 heavy melting	7.00 to 7.50
No. 1 locomotive tires	8.00 to 8.50
Misc. stand.-sec. rails	9.00 to 9.50
Railroad springs	9.50 to 10.00
Bundled sheets	6.00 to 6.50
No. 2 railroad wrought	7.75 to 8.25
No. 1 busheling	6.50 to 7.00
Cast iron borings and	
shoveling turnings	4.75 to 5.25
Rails for rolling	9.25 to 9.75
Machine shop turnings	4.50 to 5.00
Heavy turnings	5.50 to 6.00
Steel car axles	10.00 to 10.50
Iron car axles	12.50 to 13.00
Wrot. iron bars and trans.	9.00 to 9.50
No. 1 railroad wrought	6.25 to 6.75
Steel rails less than 3 ft.	11.50 to 12.00
Steel angle bars	4.50 to 5.00
Cast iron car wheels	7.00 to 7.50
No. 1 machinery cast	8.50 to 9.00
Railroad malleable	9.00 to 9.50
No. 1 railroad cast	8.50 to 9.00
Store plate	6.50 to 7.00
Relay rails, 60 lb. and	
under	16.00 to 16.50

Relay rails, 60 lb. and	
over	\$20.00 to \$21.00
Agricult. malleable	9.00 to 9.50

BOSTON

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$5.50 to \$6.00
Scrap T rails	5.50 to 6.00
Machine shop turnings	2.50 to 2.75
Cast iron borings	4.00 to 4.25
Bundled skeleton, long	4.75 to 5.00
Forge flashings	4.75 to 5.00
Blast furnace scrap	4.75 to 5.00
Shafting	9.00 to 9.50
Steel car axles	8.50 to 9.00
Wrought pipe	3.50 to 4.00
Rails for rolling	6.00 to 6.50
Cast iron borings, chemical	7.50 to 8.00
Per gross ton delivered consumers' yards:	
Textile cast	\$10.00 to \$10.50
No. 1 machinery cast	10.00 to 10.50
Store plate	6.25 to 6.50
Railroad malleable	11.00 to 12.00

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$7.25 to \$7.50
No. 2 heavy melting steel	6.25 to 6.50
Unprepared yard iron and	
steel	2.50 to 3.00
No. 1 heavy breakable cast	6.00 to 6.50
Machine shop turnings	3.00 to 3.50
Short shoveling turnings	3.00 to 3.50
Cast borings	4.50 to 4.75
No. 1 blast furnace	2.50 to 3.00
Steel car axles	10.00 to 10.50

PITTSBURGH

Base per lb.	
Plates	2.85c
Structural shapes	2.85c
Soft steel bars and small shapes	2.85c
Reinforcing steel bars	3.00c
Cold-finished and screw stock—	
Rounds and hexagons	3.20c
Squares and flats	3.20c
Hoops and bands, under 1/4 in.	3.10c
Hot-rolled annealed sheets (No. 24),	
25 or more bundles	3.15c
Galv. sheets (No. 24), 25 or more	
bundles	3.50c
Hot-rolled sheets (No. 10)	2.85c
Galv. corrug. sheets (No. 28), per	
square (more than 3750 lb.)	\$3.32
Spikes, large	2.40c
Small	2.65c
Boat	2.90c
Track bolts, all sizes, per 100 count,	
65 per cent off list.	
Machine bolts, 100 count,	
65 per cent off list.	
Carriage bolts, 100 count,	
45 per cent off list.	
Nuts, all styles, 100 count,	
70 per cent off list.	
Large rivets, base per 100 lb.	\$3.25
Wire, black, soft ann'd, base per	
100 lb.	2.90
Wire, galv. soft, base per 100 lb.	3.25
Common wire nails, per keg	2.40
Cement coated nails, per keg	2.40
On plates, structurals, bars, reinforcing	
bars, bands, hoops and blue annealed	
sheets, base applied to orders of 400 to	
9999 lb.	

CHICAGO

Base per lb.	
Plates and structural shapes	3.10c
Soft steel bars	2.90c
Cold-fn. steel bars and shafting	
Rounds and hexagons	3.25c
Flats and squares	3.25c
Band 3/16 in. (in Nos 10 and	
12 gages)	3.20c
Hoops (No. 14 gage and lighter)	3.20c
Hot-rolled annealed sheets (No. 24)	3.70c
Galv. sheets (No. 24)	4.30c
Hot-rolled sheets (No. 10)	2.85c
Spikes (9/16 in. and lighter)	3.50c
Track bolts	4.50c
Rivets, structural (keg lots)	3.00c
Rivets, boiler (keg lots)	3.10c
Per Cent Off List	
Machine bolts	60 and 5
Carriage bolts	60 and 5
Coach and lag screws	60 and 5
Hot-pressed nuts, sq., tap, or	
blank	60 and 5
Hot-pressed nuts, hex., tap, or	
blank	60 and 5
Hex. head and cap screws	85 and 10
Cup point set screws	75
Flat head bright wood screws	50 and 10
Spring cotters	60 and 10
Store bolts in full packages	72 1/2
Rd. hd. tank rivets, 7/16 in. and	
smaller	65
Wrought washers	\$5.50 off list
No. 8 black ann'd wire per 100 lb.	\$3.45
Com. wire nails, base per keg	2.70c
Cement c'd nails, base per keg	2.70c

NEW YORK

Base per lb.	
Plates	3.30c
Structural shapes	3.27c
Soft steel bars, small shapes	3.17c
Iron bars, swed. charcoal	3.40c
Col-fn. shafting and screw stock;	
Rounds and hexagons	3.79c
Flats and squares	4.29c
Cold-roll. strip, soft and quarter	
hard	4.00c
Hoops	3.42c
Bands	3.42c
Hot-rolled sheets (No. 10)	3.17c
Hot-rolled ann'd sheets (No. 24)	3.65c
Galvanized sheets (No. 24)	4.25c
Long term sheets (No. 24)	4.75c
Standard tool steel	12.00c
Wire, black annealed (No. 10)	3.60c
Wire, galv. annealed (No. 10)	4.05c

Spec. iron and steel pipe	\$4.50 to \$5.00
Forge fire	5.50 to 6.00
No. 1 railroad wrought	7.50 to 8.00
No. 1 yard wrought, long	6.50 to 7.00
Rails for rolling	8.50 to 9.00
No. 1 cast	7.00 to 7.25
No. 2 cast	6.00 to 6.25
Store plate	5.50 to 6.00
Cast borings (chemical)	12.00 to 12.50
Per gross ton, delivered local foundries:	
No. 1 machinery cast	\$9.00
No. 1 hvy. cast (cupola	
size)	8.00
No. 2 cast	7.00

CINCINNATI

Dealers' buying prices per gross ton:	
Heavy melting steel	\$8.25 to \$8.75
Scrap rails for melting	9.00 to 9.50
Bundled sheets	5.75 to 6.25
Cast iron borings	5.75 to 6.25
Machine shop turnings	5.25 to 5.75
No. 1 busheling	6.50 to 7.00
No. 2 busheling	3.25 to 3.75
Rails for rolling	9.25 to 9.75
No. 1 locomotive tires	8.50 to 9.00
Short rails	11.25 to 11.75
Cast iron car wheels	8.00 to 8.50
No. 1 machinery cast	9.50 to 10.00
No. 1 railroad cast	9.00 to 9.50
Burnt cast	6.50 to 7.00
Store plate	6.50 to 7.00
Agricultural malleable	8.50 to 9.00
Railroad malleable	9.00 to 9.50

Warehouse Prices for Steel Products

Tire steel 1/2 x 1/2 in. and larger	3.40c
Smooth finish, 1 to 2 1/2 x 1/2 in.	
and larger	3.75c
Open hearth spring steel, base	
3.75c to 10.00c	
Common wire nails, base, per keg	\$3.00
Machine bolt, cut thread: Off List	
1/2 x 6 in. and smaller	65
1 x 30 in. and smaller	65
Carriage bolts, cut thread: Off List	
1/2 x 6 in. and smaller	65
1/2 x 20 in. and smaller	65
Bolter tubes: Per 100 ft.	
Lap welded, 2-in.	\$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

Base per lb.	
Plates and struc. shapes	3.34c
Hars. soft steel or iron	3.14c
Cold-fn. rounds, shafting, screw	
stock	3.59c
Hot-rolled annealed sheets (No. 24)	3.40c
Galv. sheets (No. 24)	4.54c
Hot-rolled sheets (No. 10)	3.19c
Black corrug. sheets (No. 24)	3.65c
Galv. corrug. sheets	4.30c
Structural rivets	3.34c
Boiler rivets	3.44c
Per Cent Off List	
Tank rivets, 7/16 in. and smaller	65
Machine and carriage bolts, lag screws,	
fitted up bolts, bolt ends, plow bolts,	
hot-pressed nuts, square and hexagon,	
tapped or blank, semi-finished nuts	
1000 lb. or over	65
200 to 999 lb.	60
100 to 199 lb.	55
Less than 100 lb.	50

PHILADELPHIA

Base per lb.	
*Plates, 1/2-in. and heavier	2.60c
*Structural shapes	2.60c
*Soft steel bars, small shapes, iron	
bars (except bands)	2.60c
Reinforce, steel bars, sq., twisted and	
deform	2.30c
Cold-finished steel bars	3.58c
*Steel hoops	3.15c
*Steel bands, No. 12 to 3/16 in.	
incl.	2.90c
Spring steel	5.00c
*Hot-rolled annealed sheets (No. 24)	3.40c
*Galvanized sheets (No. 24)	4.00c
*Hot-rolled annealed sheets (No.	
10)	2.75c
Diam. pat. floor plates, 1/2 in.	3.35c
Swedish iron bars	6.00c

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.
*Base prices subject to deduction on orders aggregating 4000 lb. or over.
†For 50 bundles or over.

CLEVELAND

Base per lb.	
Plates and struc. shapes	3.21c
Soft steel bars	2.90c
Reinforce, steel bars	2.00c to 2.50c
Cold-fn. steel bars:	
Rounds, squares, hexagons	3.25c
Flats	3.40c
Flat rolled steel under 1/4 in.	3.26c
Cold-finished strip	5.55c
Hot-rolled annealed sheets (No. 24)	3.76c
Galvanized sheets (No. 24)	4.36c
Hot-rolled sheets (No. 10)	3.01c
Black ann'd wire, per 100 lb.	\$2.55
No. 9 galv. wire, per 100 lb.	2.90
Com. wire nails, base per keg	2.35

*Net base, including boxing and cutting to length.

CINCINNATI

Base per lb.	
Plates and struc. shapes	3.30c
Bars, soft steel or iron	3.10c
New billet reinforce, bars	3.10c
Rail steel reinforce, bars	3.10c

DETROIT

Dealers' buying prices per gross ton:	
Heavy melting steel	\$6.75 to \$7.25
Borings and short turnings	5.75 to 6.25
Long turnings	5.25 to 5.75
No. 1 machinery cast	7.50 to 8.00
Automotive cast	9.50 to 10.00
Hydraul. comp. sheets	6.75 to 7.25
Store plate	5.75 to 6.25
New factory busheling	5.75 to 6.25
Old No. 2 busheling	4.50 to 5.00
Sheet clippings	4.50 to 5.00
Flashings	5.50 to 6.00
Low phos. plate scrap	7.50 to 8.00

CANADA

CANADA		
Dealers' buying prices per gross ton:		
	Toronto Montreal	
Heavy melting steel	\$5.50	\$5.50
Rails, scrap	6.00	4.50
Machine shop turnings	2.50	2.50
Boiler plate	4.50	4.50
Heavy axle turnings	2.50	2.50
Cast borings	3.00	3.00
Steel borings	3.00	3.00
Wrought pipe	2.50	2.50
Steel axles	4.50	6.00
Axles, wrought iron	4.50	6.50
No. 1 machinery cast	7.75	9.00
Store plate	4.50	5.00
Standard carwheels	7.25	7.00
Malleable	8.75	7.00

Reinforcing Steel

Awards 1115 Tons—New Projects 3900 Tons

Nassau and Queens Counties, N. Y., 150 tons, rail steel mats for highways, to Igoo Brothers.

Albany County, N. Y., 350 tons, road mesh, to Kalman Steel Co.

Columbia County, N. Y., 200 tons, road mesh, to American Steel & Wire Co.

Cook County, Ill., 100 tons, paving, to Concrete Steel Co.

State of Colorado, 100 tons, highway work in five counties, to unnamed bidders.

State of Montana, 215 tons, highway work in eight counties, to unnamed bidders.

NEW REINFORCING BAR PROJECTS

Trenton, N. J., 1100 tons, highway projects; bids Nov. 13.

Bergen County, N. J., 460 tons, mesh; bids Nov. 13.

New York, 700 tons, Manhattan west side elevated highway; bids Nov. 3.

State of Illinois, 450 tons, highway bridges; bids to be taken this week.

Hamilton Field, Cal., 300 tons, three hangars; bids under advisement.

Taft, Cal., 100 tons, mausoleum; bids under advisement.

Camarillo, Cal., 150 tons, three units of State hospital; bids Nov. 14.

Los Angeles, 397 tons, bridge at Sunset and Glendale Boulevards, bids soon.

Pearl Harbor, T. H., 250 tons, torpedo storage building, Specification No. 7074; bids Nov. 29.

Pipe Lines

Colton, Cal., plans 95,900 ft. of 8 and 10-in. and quantity of 6-in. steel pipe for main water supply in connection with expansion and improvements to cost \$94,000. Frank Currie, Andreson Block, San Bernardino, Cal., is consulting engineer.

Producers & Consumers Gas Co., Huntington, W. Va., A. A. Lilly, head, plans about eight miles of distribution system for natural gas supply. Franchise has been asked.

General Purchasing Officer, Panama Canal, Washington, asks bids until Nov. 6 for 14 pieces welded steel pipe (Schedule 2915).

Alco Products, Inc., Dunkirk, N. Y., has secured contract from Cleveland for about 23,000 ft. of 30 and 42-in. welded steel pipe, in connection with \$1,500,000 program for water main extensions, for which financing has been arranged.

Apache Gas Co., Perry, Okla., plans 8-in. welded steel natural gas pipe line from point near city to Stillwater, Okla., and vicinity, about eight miles.

Alabama Utilities Co., Selma, Ala., plans new welded steel pipe line for high-pressure gas service in western part of city.

Moran Corp., Esperson Building, Houston, Tex., has secured contract for natural gas supply at Tomball, Tex., and plans steel pipe line. David M. Duller Co., Second National Bank Building, Houston, is consulting engineer.

Cast Iron Pipe

Vienna, Md., plans installation of about 5850 ft. of 6 and 8-in. for water supply. Francis H. Dryden, Salisbury, Md., is engineer.

Durham, N. C., asks bids until Nov. 9 for about 870 tons of culvert grade pipe, 8 to 36-in. diameter, in connection with new outfall sewers and sewage treatment plant, for which bids will be received at same time. R. W. Flack is city manager.

Beulah, Mich., plans pipe line system for water supply. Financing for \$40,000 planned.

Francis Engineering Co., Saginaw, Mich., is engineer.

Oakhill, Ohio, plans pipe line system for water supply. Fund of \$100,000 is being arranged. H. K. Boll, Lexington, Ky., is engineer.

Chicago is in the market for 200 tons of 20-in.

Circle, Mont., plans about 20,000 ft. of 4 to 6-in. for new water supply system. Bond issue of \$60,000 is being arranged. R. N. Stewart, Miles City, Mont., is engineer.

Panguitch, Utah, plans installation of pipe line system for water supply, replacing present wood pipe with cast iron sections. Cost about \$70,000. Financing is being arranged. J. H. Clark is engineer.

San Fernando, Cal., plans early purchase of

about 1000 ft. of 6-in. for water system. H. E. Waite, water superintendent, is in charge.

Puget Sound Navy Yard has awarded 325 tons to United States Pipe & Foundry Co.

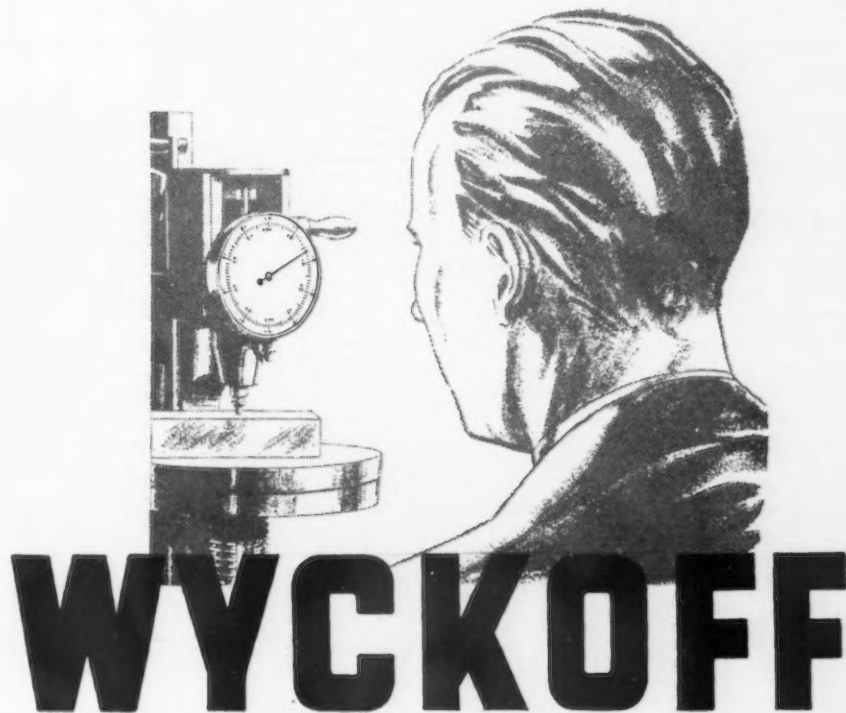
Railroad Equipment

Detroit, Toledo & Ironton is asking for bids covering material to modernize 100 to 300 box cars.

Aberdeen & Rockfish has bought one combination passenger and baggage motor car from J. G. Brill Co.

Beaver Valley has purchased one 30-ton gasoline locomotive from Fate-Root-Heath Co.

Great Northern is installing five new boilers in mallet-type locomotives in its own shops.



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*products of unceasing vigilance
... always—*

Metallurgically trained men backed by modern scientific testing and inspecting facilities supervise every step in the manufacture of WYCKOFF COLD DRAWN STEELS, —your constant assurance of those qualities of fitness and uniformity in your finished product so essential to the maintenance of present day production standards.

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We will welcome an opportunity to serve you.

WYCKOFF DRAWN STEEL COMPANY

GENERAL OFFICES—Ambridge, Penna.
MILLS—Ambridge, Penna. and Chicago, Ill.

PLANT EXPANSION AND EQUIPMENT BUYING

◀ NEW ENGLAND ▶

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Nov. 8 for two 35,000-bbl. capacity steel fuel oil tanks for naval fuel depot, Melville, R. I. (Specification 7001).

Charles B. Blouin, Inc., Boston, has been organized by Charles P. Blouin and A. George DeCost, 131 Pembroke Street, to manufacture sheet metal products.

Apothecaries Hall Co., Benedict Street, Waterbury, Conn., manufacturer of industrial chemicals, etc., has plans for one-story plant unit at Broad Brook, about 50,000 sq. ft. floor space, to replace building recently destroyed by fire. Cost over \$75,000 with equipment. John J. Hart, 25 Huntington Avenue, Boston, is engineer.

Navy Department, Washington, has secured fund of \$24,425 for new tools and mechanical-handling equipment for Portsmouth, N. H., and Boston navy yards.

Domark Co., Amesbury, Mass., manufacturer of industrial air-cooled motors, parts, etc., has acquired former plant No. 4 of Walker Body Co., Oakland Street, for new factory.

◀ NORTH ATLANTIC ▶

Schenley Distillers, Inc., formerly Schenley Products Co., 1819 Broadway, New York, operating distilleries in Pennsylvania and Kentucky, has leased building at 644-54 Greenwich Street, about 100,000 sq. ft. floor space, for new storage and distributing plant.

Kupchik, Inc., New York, has been organized by Irwin S. Rever, 191 Joralemon Street, Brooklyn, and associates, to manufacture locks and locking devices.

Superintendent of Lighthouses, St. George, Staten Island, N. Y., asks bids until Nov. 9 for 20 steel gas buoys, 9 ft. diameter by 32 ft. long to 5 ft. diameter by 15 ft. long, all with skeleton lantern towers and bottom counterweights; also two buoys complete with acetylene illuminating equipment (Proposal 44740).

American Distilling & Distributing Corp., 242 Sumner Avenue, Brooklyn, has leased five-story building at 390-92 Greenwich Street, and will remodel for new branch storage and distributing plant.

Village Council, Amityville, L. I., plans installation of pumping machinery and auxiliary equipment, pipe lines, etc., for new municipal waterworks. Cost about \$400,000. Financing is being arranged. Russell G. and Walter M. Cory, 30 Church Street, New York, are engineers.

Union Free School District No. 15, Lawrence, L. I., plans manual training department in new multi-story high school. Cost \$825,000 with equipment. Financing in such amount is being arranged.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Nov. 8 for new shell house and four magazine units at naval ammunition depot, Lake Denmark, N. J. (Specification 7339). **Public Works Officer, Third Naval District, New York,** asks bids until Nov. 22 for water and sewerage system at same place, including pipe lines, etc. (Specification 7349). Fund of \$298,000 has been authorized for new buildings and equipment at this depot.

Chesebro-Whitman Mfg. Corp., Long Island City, has been organized to manufacture electrical machinery and parts, and operate a general machine works. New company will take over Chesebro-Whitman Co., 38-21 Twelfth Street, manufacturer of ladders and kindred specialties, and carry out expansion.

Wilson-Bennett Mfg. Co., 6532 South Menard Avenue, Clearing, Chicago, manufacturer of steel barrels, drums, etc., has purchased four-story mill at foot of Linden Street and Lembeck Avenue, Jersey City, N. J., on site 631 x 1337 ft., for new Eastern branch plant.

Raritan Valley Municipal League, Borough Hall, Bound Brook, N. J., plans installation of pumping machinery and auxiliary equipment for new sewage disposal plants and extensions in municipal sewerage systems, pipe lines, etc., for service at Bound Brook, Somerville, Manville and vicinity. Cost over \$1,000,000. Waldo S. Coulter, 120 Liberty Street, New York, is engineer; Remington, Vosburg & Goff, 509 Cooper Street, Camden, N. J., are consulting engineers.

Tidewater Iron & Steel Corp., Passaic, N. J., has been organized by Alan G. Winters and Edwin Fairclough, 175 River Drive, capital \$75,000, to operate a general iron and steel works.

Department of Public Safety, Perth Amboy, N. J., John V. Smith, director, plans installation of pumping machinery, sludge-handling and other equipment in new municipal sewage disposal plant. Cost \$850,000 with machinery. Financing is being arranged. Louis P. Booz is city engineer.

Continental Distilling Corp., Snyder Avenue and Swanson Street, Philadelphia, has taken title to property on Swanson, Water and Vandallia Streets and plans erection of first unit of new distilling plant, to be operated in conjunction with present distillery. Cost about \$1,000,000 with equipment. Company has let general contract to S. H. Levin, 1619 Sansom Street, for new storage and distributing plant. Cost about \$75,000 with equipment.

Samson Products Co., Inc., 1431 Brown Street, Philadelphia, manufacturer of automobile bearings and kindred equipment, has leased one-story building at 2024-28 East Westmoreland Street, 10,000 sq. ft. floor space, for new plant.

Navy Department, Washington, has secured fund of \$34,425 for new tools, and mechanical-handling equipment for naval aircraft factory and navy yard, Philadelphia.

◀ WESTERN PENNA. ▶

Hookless Fastener Co., Meadville, Pa., manufacturer of metal fasteners, has let general contract to Hughes-Foulrod Co., Koppers Building, Pittsburgh, for one-story addition, 60 x 300 ft. Cost about \$150,000 with equipment. Wilbur Watson & Associates, 4614 Prospect Avenue, Cleveland, are architects.

Northwestern Mining & Exchange Co., Dagus, near Ridgway, Pa., plans rebuilding tippie at local coal mining properties recently damaged by fire. Loss over \$50,000 with equipment. Headquarters are at Scranton, Pa.

Sharon Tax Justice League, Sharon, Pa., J. A. Loch, chairman, utilities committee, is considering erection of joint power plant with New Castle Tax Justice League, New Castle, Pa., on 5-acre tract on Shenango River. Cost about \$900,000 with transmission lines, power substations and distributing stations.

◀ BUFFALO DISTRICT ▶

Worthington Pump & Machinery Corp., Clinton and Roberts Streets, Buffalo, has let general contract to John W. Cowper Co., Rand Building, for three-story addition. Cost over \$30,000.

Kensington Electrical Appliance Co., Inc., Buffalo, has been organized by Harry J. Davis, 148 Lovering Avenue, and Frank Quinn, 164 Hughes Avenue, to manufacture electrical appliances and equipment.

Jackson Manion Consolidated Mines, Ltd., Red Lake, Ont., plans new ore mill at local gold mining properties. Cost over \$85,000 with machinery. D. M. Thompson is engineer.

◀ WASHINGTON DISTRICT ▶

Appalachian Electric Power Co., Roanoke, Va., plans new power substation and distributing plant near city limits at Danville, Va., for service to industrial plants in that district. Cost about \$150,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Nov. 8 for relocating airplane hangar at marine barracks flying field, Quantico, Va. (Specification 7082); until Nov. 15, three new hangars with repair and reconditioning shops, same field (Specification 7508); until Nov. 22, new gasoline storage, pumping and distribution system (Specification 7529) for water, sewage and drainage systems, including pipe lines, etc. (Specification 7511).

City Council, Newport News, Va., plans installation of electric-operated pumping plant, 1,000,000-gal. capacity steel tank, pipe lines, etc., for extensions and improvements in municipal waterworks. Fund of \$197,000 is being arranged.

Colonial Distilling Co., Baltimore, recently organized by W. E. Edmondson and associates, has acquired former packing plant at 2700 Marwile Road, and will remodel for new distillery. Headquarters will be established at same location.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 7 for 4000 doz. hack-saw blades (Schedule 917) for Mare Island Navy Yard; air-driven boiler tube cleaning outfits and spare parts (Schedule 912) for Eastern and Western yards; abrasive wheels (Schedule 943) for all yards.

◀ SOUTH ATLANTIC ▶

Seaboard Air Line Railway, North Florida Division, Jacksonville, Fla., Gordon L. Hurley, superintendent, plans extensions and improvements in locomotive and car repair shops, reconditioning and repair of rolling stock and equipment and track work. Cost over \$400,000 with equipment.

Department of Public Works, Courthouse Building, Miami, Fla., William Sydow, director, asks bids until Nov. 16 for extensions and improvements in municipal waterworks and system, including pumping machinery and power station equipment, pipe lines, etc. Fund of \$560,000 authorized for work.

Old South Brewing Co., Winston-Salem, N. C., recently organized, has purchased plant of Sterling Flour Mill Co., Statesville, N. C., and will modernize for new brewery. Cost over \$300,000 with equipment.

Appleton Mills, Anderson, S. C., has approved plans for complete electrification of cotton mills. Cost over \$150,000 with equipment.

City Council, Durham, N. C., R. W. Flack, city manager, asks bids until Nov. 9 for sewage treatment plant and system, including engine-driven generators, air compressors, tanks, mechanical screens, gas holder, pipe lines and other equipment. W. M. Piatt is city engineer.

City Council, Leesburg, Fla., plans municipal artificial gas plant. Cost about \$60,000 with equipment. Onon E. Green is superintendent of municipal utilities.

B.-J. Aircraft Corp., Dundalk, Md., manufacturer of airplanes and parts, has plans for two one-story additions, 100 x 175 ft., and 100 x 280 ft. Cost over \$75,000 with equipment.

◀ OHIO AND INDIANA ▶

Carey Machine Co., 9518 Cassius Avenue, Cleveland, general machinist, manufacturer of tools, jigs, etc., plans one-story forge shop addition, 80 x 100 ft.

H. H. Harrold Machine Co., Wooster, Ohio, manufacturer of machinery and parts, plans new works at New Philadelphia, Ohio, where building will be leased, and will remove to new location.

Dover Mfg. Co., Dover, Ohio, manufacturer of sad irons and kindred products, has approved plans for one-story addition, 55 x 130 ft. Cost over \$35,000 with equipment.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until Nov. 7 for 950,000 plain steel washers, 10,000 plain brass washers, 50,000 flat washers for wood, 6000 ball-socket washers (Circular 118); until Nov. 8, 54,000 self-locking nuts (Circular 113); until Nov. 14, steel aircraft bolts, clevis bolts and nuts (Circular 120).

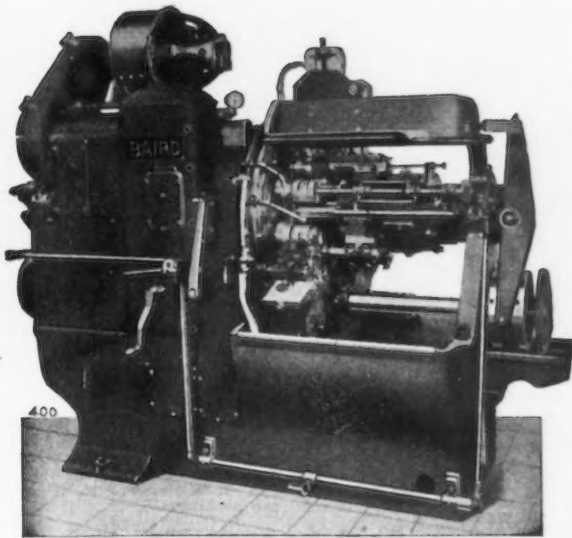
Department of Public Service, Galion, Ohio, K. A. Piester, director, plans steel water tank, 400,000-gal. capacity, on elevated steel tower, pumping machinery and auxiliary equipment for municipal water system. Cost about \$25,000. R. A. McDowell, Chester-Twelfth Street Building, Cleveland, is consulting engineer.

Forest City Brewing Co., Inc., 6922 Union Avenue, Toledo, Ohio, has plans for extensions and improvements in former plant of Huebner Toledo Brewing Co., recently acquired, including equipment. Cost about \$300,000 with equipment. E. A. Broberg, Lorain Street Bank Building, Cleveland, is engineer.

Clyffside Brewing Co., 2302 Park Avenue, Cincinnati, recently organized by Paul Esselborn and associates, has taken over former Mohawk brewery, and will modernize for new



Non-Productive Time Less Than 3 Seconds!



Most Productive Time—

Least Lost Time!

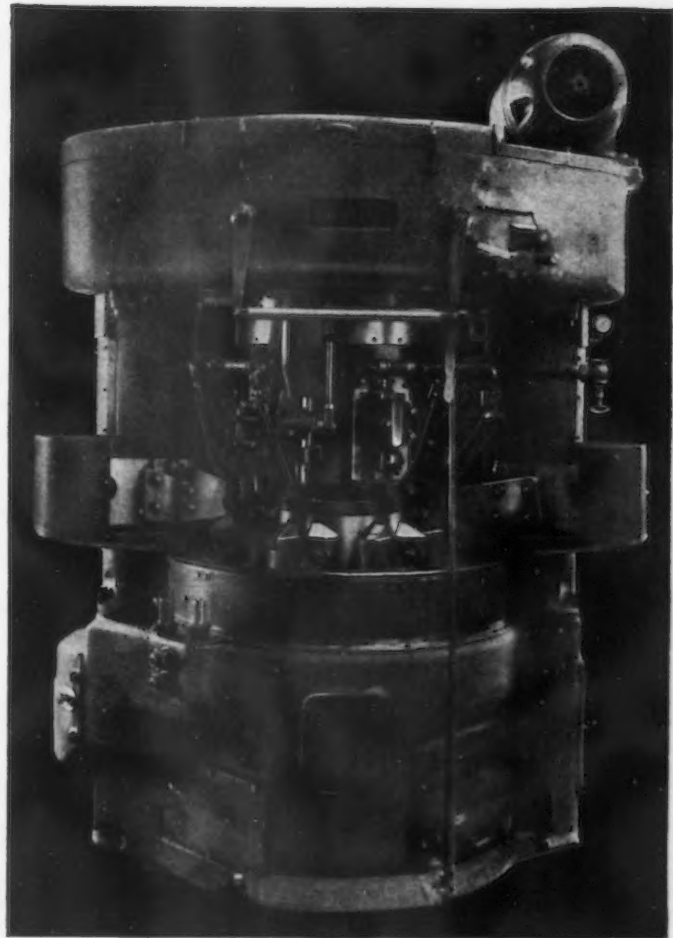
The speed of operation of the "Baird" 7" Horizontal Chucking Machine is clearly indicated by the fact that its lost time (from the completion of one cut to the start of the next) is only 2.15 seconds for single indexing, and 2.78 seconds for double indexing. On the 10 1/2" Vertical "Baird" these times are 4.97 and 5.5 seconds respectively.

This "Least Lost Time" is only one of the features making for efficiency in "Baird" Automatic Machines. Another feature is the combination of design construction method of machining and quality of workmanship. This makes it possible to attain the highest degree of accuracy in the machined parts, and enables "Baird" machines to be kept accurate.

Baird Horizontal and Vertical Automatic Lathes take work from 10 1/2" dia. down including work to be turned on centers. They perform all the usual lathe operations, and in addition at the same time they drill several holes, mill slots or oil grooves, insert, ream and bore bushings, buffing turned surfaces, etc.

Another feature is that of double indexing whereby two pieces may be unloaded at each cycle. Or one piece may be relocated after the first pass through and machined on the opposite end during the second pass. This is a "Baird" patented feature.

What have you on which Baird might cut costs? Ask Baird About It.



THE BAIRD MACHINE COMPANY, BRIDGEPORT, CONN.

plant. Cost over \$100,000 with machinery. George A. Schwenzer, Blymyer Building, is engineer.

Gold Medal Brewing Co., 1300-40 Madison Avenue, Indianapolis, recently organized by Frank W. Hoch and Norman E. Patrick, address noted, has taken over former plant of Indianapolis Brewing Co., location noted, and will remodel for new plant. Cost over \$75,000 with machinery.

Indianapolis Malleable Iron Co., 546 North Holmes Avenue, Indianapolis, has been organized by S. C. Wasson and R. S. Davis, address noted, to manufacture castings and kindred iron products.

City Council, Newcastle, Ind., plans extensions and improvements in municipal electric light and power plant, including additional equipment. Cost about \$400,000 with machinery. Financing is being arranged.

Highland Body Mfg. Co., Center Hill, Elmwood, Cincinnati, manufacturer of automobile bodies, has plans for one-story addition, 63 x 187 ft. Cost about \$35,000 with equipment.

◀ MICHIGAN DISTRICT ▶

Flint Hill Brewing Co., 2001 South Saginaw Street, Flint, Mich., recently organized by Charles Marienthal, 17260 Gable Street, Detroit, plans addition and improvements to former local brewery. Cost about \$100,000 with equipment. George Bachman, Flint, is architect.

Detroit Gear & Machine Co., Detroit, has let general contract to Stokes & Whittingham, Penobscot Building, for one-story addition. Cost over \$25,000 with equipment.

Universal Brewery Equipment Corp., 3625 Superior Street, Detroit, has been organized by Robert June, 1603 Longfellow Avenue, and associates, to manufacture brewery machinery and parts.

Four Flags Brewing Co., Niles, Mich., recently formed, has acquired former plant of Niles City Dairy Co., and will remodel for new brewery. Cost over \$70,000 with equipment.

City Council, Owosso, Mich., plans installation of pumping machinery, sludge handling equipment, pipe lines, etc., for new municipal sewage disposal plant. Cost \$130,000 with equipment. Francis Engineering Co., Saginaw, Mich., is consulting engineer.

Northern Brewing Co., Petoskey, Mich., has plans for addition, including improvements in present plant. Cost about \$100,000 with equipment. Don Lakie, Grand Rapids, Mich., is architect.

◀ MIDDLE WEST ▶

Armour & Co., Union Stock Yards, Chicago, have filed plans for five-story addition to canning plant, 18 x 195 ft., at 1238 West Forty-third Street. Cost about \$75,000 with equipment. F. A. Lindberg is company architect.

City Council, Aurora, Ill., plans installation of pumping machinery and other equipment, pipe lines, etc., for extensions and improvements in municipal water system. Cost \$450,000. Financing is being arranged.

F. E. Wylie, 2561 Newport Avenue, Omaha, Neb., plans airplane plant for parts production and assembling in connection with new air field and flying school at Red Oak, Iowa. Cost over \$100,000 with equipment. W. C. Cummings, Omaha, is engineer.

Village Council, Hancock, Minn., has plans for new municipal electric light and power plant. Cost about \$40,000 with equipment. Bonds authorized. Engineering Service Co., New York Life Building, St. Paul, Minn., is consulting engineer.

Fontnelle Brewing Co., Omaha, Neb., has let general contract to Parsons Construction Co., 701 North Twentieth Street, for three-story and basement storage and distributing plant, 52 x 75 ft. Cost about \$40,000 with equipment.

School District No. 1, Butte, Mont., J. G. Ragsdale, city superintendent of schools, plans manual training department in new three-story and basement high school. Cost \$800,000. Financing is being arranged. Walter Arnold, Metals Bank Building, is architect.

Common Council, Cering, Neb., is arranging fund of \$65,000 for new municipal electric light and power plant, using Diesel engine-generator unit. C. Robert Fulton, 2327 South Nineteenth Street, Lincoln, Neb., is consulting engineer.

City Council, Winona, Minn., plans installation of pumping machinery, sludge handling equipment, pipe lines, etc., for new municipal sewage disposal works. Fund of \$275,000 is being arranged. E. E. Chadwick, City Hall, is city engineer; Pearce, Greeley & Hansen, 6 North Michigan Avenue, Chicago, are consulting engineers.

United States Engineer Office, Federal Building, Rock Island, Ill., asks bids until Nov. 7 for new lock No. 21, Mississippi River, near Quincy, Ill., including 250,422 lb. steel forgings, 100,271 lb. Class B. steel castings, 5220 lb. nickel steel castings, 30,064 lb. iron castings, 641,312 lb. concrete reinforcing steel, 1661 lin. ft. steel pipe hand-railing, metal conduit, wrought iron pipe, etc., and four lock gate operating machines, four tainter valve operating machines, one central control station (Circular 51).

Kroeschell Boiler Co., Chicago, has leased plant of Freeman Mfg. Co., Reichert Court, Racine, Wis., from trustee for bondholders, and will use as its production center, lease on shops in Chicago having expired. Company will maintain general offices at 3254 North Kedzie Avenue, Chicago, and a service and repair department for Chicago district. It manufactures water tube, internally fired, tubular and greenhouse boilers, tanks, stacks, breechings, truck turn-tables for highway work, etc. O. M. Tollstam, Chicago, will be superintendent of Racine plant.

◀ SOUTH CENTRAL ▶

Bernheim Distilling Co., Lexington Road and Payne Street, Louisville, has approved plans for addition to distillery, including improvements in present plant and additional equipment; new power house will be built. Cost about \$75,000 with machinery. Leslie V. Abbott, 8 Kenwood Village, city, is architect.

Sewerage and Water Board, New Orleans, plans new electric-operated pumping plants, underground power distributing lines, disposal plant and other structures, with pipe lines, etc., for extensions and improvements in municipal water and sewerage systems. Cost \$7,000,000. Financing in that amount is being arranged.

Tennessee Valley Authority, Muscle Shoals, Ala., Arthur E. Morgan, chairman, will make purchases of mechanical equipment and materials, totaling about \$1,500,000, during next 60 days for construction work on Norris dam power project on Clinch River, near Knoxville, Tenn. Lewellyn Evans, Muscle Shoals, is consulting electrical engineer.

Common Council, Starkville, Miss., plans erection of a municipal electric light and power distribution system. Cost about \$30,000. Financing is being arranged. Also fund of \$25,487 for extensions and improvements in water supply system, including pumping machinery, pipe lines, etc.

◀ SOUTHWEST ▶

Sahara Brewing Co., Topeka, Kan., care of William J. Koch, 2233 Grand Avenue, Kansas City, Mo., architect, recently organized by Clyde L. Smalley, 1446 Lakeside Drive, Topeka, and associates, has plans for new seven-story and basement plant, 75 x 200 ft., with one-story and basement bottling house adjoining, 50 x 150 ft. Cost about \$150,000 with equipment. Mid-West Engineering Co., Kansas City, address noted, is consulting engineer.

Common Council, Houston, Mo., plans installation of pumping machinery and auxiliary equipment, pipe lines, etc., for municipal waterworks and distribution system. Fund of \$52,000 is being arranged for work. C. A. Haskins & Co., Finance Building, Kansas City, Mo., are consulting engineers.

City Council, Cape Girardeau, Mo., is arranging financing for \$685,000 for new municipal electric light and power plant. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

South Jackson County Missouri Water Co., Grandview, Mo., plans installation of elevated steel tank, 250,000-gal. capacity, pumping machinery, pipe lines, etc., for extensions in water system. Financing for \$190,000 is under way. C. A. Haskins & Co., Finance Building, Kansas City, Mo., are consulting engineers.

Common Council, Chandler, Okla., is arranging financing for \$130,000 for new municipal electric light and power plant.

Common Council, Concordia, Mo., has been authorized at special election to arrange bonds for \$70,000 for new municipal electric light and power plant. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are consulting engineers.

Texas Brewing Co., 215 Broadway, San Antonio, Tex., has approved plans for extensions

and improvements in plant at Pratt, near San Antonio, including new bottling works. Cost about \$175,000 with equipment. Eugene W. Staph, Insurance Building, San Antonio, is architect.

Common Council, Brownsville, Tex., plans addition to municipal electric light and power plant for auxiliary power service, extensions in light and power distribution system, and new electric-operated pumping plant for city water service. Fund of \$200,000 has been secured.

Commanding Officer, Fort Sam Houston, Tex., has secured appropriation of \$3,149,508 for new buildings and equipment. Work will include new ordnance shops and sheds, engineer depot warehouse, quartermaster warehouse, radio transmitter building, magazines, garage, gun sheds and other structures. Also \$675,000 for improvements and reconditioning, including electrical system, water system and other utilities.

◀ PACIFIC COAST ▶

Santa Cruz Portland Cement Co., Crocker Building, San Francisco, has selected 4-acre tract at Stockton, Cal., as site for new mill, including power house, machine shop and other units. Cost about \$100,000 with equipment. Project will form part of expansion program at different points on Pacific Coast, to cost about \$1,000,000.

Southwest Welding Co., 3201 West Mission Street, Alhambra, Cal., has let contract to Pennsylvania Iron & Steel Co., 2308 Santa Fe Avenue, Los Angeles, for one-story addition, 73 x 210 ft.

Navy Department, Washington, has secured appropriations for purchase of new tools and mechanical-handling equipment at Pacific Coast yards, as follows: Mare Island, \$21,945; San Diego naval air station and naval supply depot, \$15,750, and Puget Sound, \$37,700.

Samarkand Brewing Co., 893 Folsom Street, San Francisco, asks bids at once for new three-story plant at Oakland, Cal. Cost about \$275,000 with machinery. O'Brien Brothers and W. D. Peugh, 333 Montgomery Street, San Francisco, are architects.

Gilmack Brewing Co., Elliott Avenue and Battery Street, Seattle, will erect four-story and basement addition, 90 x 120 ft. Cost over \$75,000 with equipment. Carl Siebrand, 5016 Twenty-first Avenue, N. E., is architect.

P. D. Snyder, Coupeville, Wash., plans immediate erection of light and power plant, using Diesel engine-generator units, at Republic, Wash., where franchise has been secured. Cost about \$40,000 with distributing lines.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 7 for one wood-working shaper (Schedule 953), two portable air compressors (Schedule 972), all motor driven, for San Diego Navy Yard; 30,000 ft. insulated electric cable for arc welding (Schedule 1008), two wet tool grinders (Schedule 975), one geared-head engine lathe (Schedule 956), all motor driven, for Mare Island yard; one 40-kw. and one 12-kw. electric core ovens (Schedule 966) for Los Angeles and Mare Island yards, respectively; two motor-driven pedestal type grinders (Schedule 977) for Puget Sound yard.

Chrysler Corp., 341 Massachusetts Avenue, Detroit, has let general contract to William P. Neil Co., 4814 Loma Vista Street, Los Angeles, for one-story addition to automobile plant at Los Angeles, 280 x 300 ft. Cost about \$100,000 with equipment. Harry T. Miller, 4813 Loma Vista Street, Los Angeles, is architect.

◀ FOREIGN ▶

Monsanto Chemical Works, Ltd., Cefn Mawr, Denbighshire, England, manufacturer of industrial chemicals, etc., is planning additions and improvements in plant, including new equipment. Cost \$250,000 (about \$1,140,000) with machinery. Company is affiliated with Monsanto Chemical Works, St. Louis.

Egyptian Misr Co., Ltd., Cairo, Egypt, manufacturer of cotton goods and other textile products, plans erection of new cotton mill, about 200 x 900 ft. Cost over \$800,000 with machinery.

Manfred Weiss Steel Works, A-G, Budapest, Hungary, plans new works for production of aluminum and aluminum products, to cost over \$200,000 with equipment. Project will be affiliated with new works of Aluminum Erzbergwerke U. Industrie, A-G, Budapest, at Csepel, an island south of city, to cost like sum. Last noted organization is an interest of Bauxite Trust, A-G, Zurich, Switzerland.



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FOR the first time in history, manufacturers seem about to face lively competition among each other on a purely quality basis! This should raise the entire level of excellence in product design. And a thoroughgoing refinement of the countless little things which heretofore were considered to be good enough may in many cases be the only available means of meeting this new competition.

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If your product is used around salt water, swampy districts, or gas-impregnated areas, specify springs of Seymour Phosphor Bronze for reliability. The stubborn resistance of this alloy to rust and corrosion will justify its slight extra cost many times over . . . as would also any one of such other characteristics as its extreme fatigue resistance, high resiliency, refusal to spark when struck, and its constancy in the face of sudden temperature changes.

An interesting folder is to be had on request. We will also gladly send you or your spring maker flat and round spring stock for test.



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New Approaches to the Study of the Deformation of Steel

(Concluded from Page 17)

TABLE II—Determination of Deformation Constant d

$d = E \left(\frac{100}{R} - 1 \right)$					
	Elongation	S.A.E. 6130		S.A.E. 3130	
		Reduction of Area	Deformation Constant	Reduction of Area	Deformation Factor
Tempered at 800 deg. F.					
Standard deviations..	12.2	50.5	11.91	12.9	51.0
	15.3	58.0	11.06	15.5	57.0
Tempered at 1000 deg. F.					
Standard deviations..	15.2	54.7	12.16	18.0	61.0
	18.6	61.5	11.53	81.2	65.5
Tempered at 1200 deg. F.					
Standard deviations..	19.1	62.0	11.65	22.8	67.8
	23.6	67.8	11.09	26.4	71.8

TABLE III—Table Showing Actual and Calculated Tensile Yield Point Y

	S.A.E. 6130		S.A.E. 3130	
	Actual	Calculated	Actual	Calculated
Drawn at 800 deg. F.				
Standard deviation	182,000	180,000	168,000	168,000
	142,000	150,000	144,000	150,000
Drawn at 1000 deg. F.				
Standard deviation	157,000	150,000	134,000	134,500
	122,000	124,000	117,000	115,000
Drawn at 1200 deg. F.				
Standard deviation	128,000	125,000	107,000	107,000
	102,000	98,000	87,000	90,000

ratio of elongation percentage to 100 minus reduction of area percentage as shown in the following equation:

$$I = \frac{100 \times E}{(100 - R)} \quad (4)$$

where E and R are as in equation (1), and I = Izod impact in ft.-lb.

A transformation table of Izod im-

pact in ft. lb. to Charpy impact in kilogram-meters is given in Fig. 6.

It is obvious that tests from temper brittle steels are not to be considered. All data are derived from test results taken from the Report of Steel Research Committee of the British Engineering Standard Association, Re-

search No. 75, and our own data on specimens conforming to standard dimensions of the American Society for Testing Materials.

Apparent Relation of Machinability to Deformation

Regarding the machinability, the writer does not endeavor to give any definite statement, but wishes to point out the prevalent dilemma as to Brinell hardness numerals and machinability. The largest deformation constant (100) and the highest elongation property is inherent to certain austenitic steels, e.g., to high carbon, 12 per cent manganese steel (Hadfield steel) which exhibits the most difficult machineability. Thus we are led to inquire whether, of two steels of the same tensile strength or the same Brinell hardness, the one will be easier to machine which possesses a lower deformation constant and a lower elongation per cent. It may be pointed out that the value of the deformation constant will be of use only when deformation or necking takes place approximately in the center of the specimen.

Conclusions

A consideration of static physical properties, notch toughness and machineability of steels results in the following:

- 1—The value of the deformation constant in any particular steel increases as the size of the quenched section increases or as the quench is less drastic. Also, different steels, varying with the size of the section and the severity of the quench, may arrive at the same deformation constant. When different steels have the same deformation constant at the same tensile strength, the ratio of tensile strength and tensile yield point will be the same.
- 2—The deformation indicates a relation of the static physical tensile test to the notch toughness.
- 3—The characteristics of deformation together with Brinell hardness appear to be an index to machineability.
- 4—There appears to be an index to hardening potency for nickel-chrome steels which may be expressed by the product of nickel and chrome content.

The Illinois Commerce Commission, the Chicago Board of Trade and others are asking for a preliminary injunction against enforcement of the Interstate Commerce Commission's order increasing intrastate switching rates in the Chicago district to the interstate switching rate level.

At the request of President Roosevelt a planning board has been appointed to prepare for the inclusion of the St. Lawrence waterway project in the Government's public works program.



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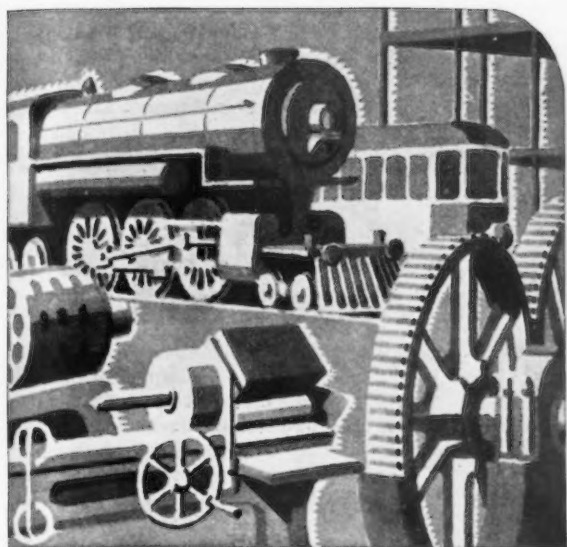
Many pages in the Perkins 102 page catalog contain tables and gear calculation data. Mechanical executives and designers find this catalog extremely useful.

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LOCOMOTIVES AND LATHES

as well as SUGAR AND SHOES

The great national recovery effort, centering at first upon stimulation of consumption goods, is now broadening to include products of a longer term of use, known generally as capital goods.

That such a step is essential to the success of the recovery program is evident. In 1929 consumption goods produced were valued at \$30,000,000,000, while the value of durable goods (including automobiles) was \$40,000,000,000.

At the low point of the depression consumption goods output dropped only 25 per cent below 1929, that of durable goods fell 65 per cent below 1929.

Normally purchases of machinery of all kinds exceed \$5,000,000,000 annually, but were only about \$1,000,000,000 in 1932.

Railroad purchases of supplies and equipment of all kinds normally are \$4,500,000,000 each year. They were about \$2,500,000,000 last year.

Building construction formerly averaged \$8,000,000,000 annually, but is at the rate of \$1,200,000,000 in 1933.

For many years the plants of the Interlake Iron Corporation have served the industries interested in the manufacture of capital goods, of which the country has a vast accumulated need.



INTERLAKE IRON CORPORATION

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CLEVELAND . CHICAGO . DETROIT . ERIE . TOLEDO . MINNEAPOLIS . DULUTH

Uncle Sam As An Unfair Competitor

(Concluded from Page 26)

plant that is the largest plant of its kind in the country, being capable of producing twenty-five per cent of the requirements of the cotton duck trade, and in addition there are cotton textile plants operated at seven other prisons.

It must be apparent that these activities of the Government can have only one effect as far as commodity prices are concerned, and that is to break down any possibility of building up a fair price structure; private enterprise should not be expected to compete in price with goods made in Federal prisons, and American Labor should not be expected to suffer unemployment due to our prisons being equipped with high speed production machinery; taxpayers' money should not be expended in the creation of governmental manufacturing facilities whose sole purpose is to break down a fair price market, making it impossible for employers to pay a fair wage, or earn fair profits on which tax returns can be made to the public treasury.

The evils covered in the Shannon report are the result of years of pyramiding on the part of governmental bureaus, and as the report points out the policy motivating these extraordinary activities under the prevailing interpretation of governmental function seems to have been "once a bureau always a bureau." No bureau or agency that has ever been created has surrendered its power or prerogatives without a struggle. President Roosevelt, however, has shown that this theory holds no favor with him.

and in view of the heroic efforts he is making to secure the rehabilitation of industry through a return to normal conditions by increasing consumption, through an increase in purchasing power, higher wages, higher commodity prices, and the establishment of fair competitive practices, it is safe to assume that when Congress again convenes the Shannon report will receive very careful consideration.

Activity in Structural Steel Declines Sharply

SEPTEMBER bookings of fabricated structural steel were approximately 30 per cent less than in August, and shipments declined nearly 20 per cent, according to the American Institute of Steel Construction, Inc. With 76 companies, representing 62 per cent of the industry, reported bookings last month were 38,692 tons while 40,375 tons was shipped. Uncertainties caused by the delay of the NRA to consider the provisions of the code for the steel construction industry is advanced as the major factor contributing to contraction in activity.

River Shipments of Steel Decline

SHIPMENTS of iron and steel products on the Ohio River in the Pittsburgh district in September aggregated 38,480 net tons, compared with 69,531

tons in August, 62,096 tons in July, and 28,557 tons in September, 1932, according to the latest report of the United States Engineer Office, Pittsburgh. Total movement of steel products on the Monongahela River in September was 43,026 tons, compared with 67,389 tons in August, and 18,831 tons in September, 1932. Shipments of iron and steel on the Allegheny River last month totaled only 2000 tons.

Chicago Machine Tool Activity is Sustained

MACHINE tool activity in the Chicago district continues to hold up fairly well, although a decline from the July and August levels is reported. The Inland Steel Co. has purchased two large lathes and two roll grinders, and the International Harvester Co. has placed two crank lathes and two crank grinders. The latter company also has additional machinery and equipment to purchase as a result of its undertaking the manufacture of light trucks in its own plants.

Large Wisconsin buyers of machine tools are also showing more interest in purchases. The Nash Motors Co., Kenosha, Wis., will require a few new tools in connection with its introduction of a new small car, although present equipment will be rebuilt in most instances.

Establishes Roeber Fund for Electrochemists

AS the nucleus of a fund in memory of Dr. E. F. Roeber, the interest of the fund to assist young research electrochemists, Dr. Colin G. Fink, Columbia University, has given \$1,000. Dr. Fink, who is also secretary of the Electrochemical Society, was awarded the Edward Goodrich Acheson medal at the recent meeting of the society for distinguished services in electrochemistry. With the medal goes a prize of \$1,000, which Dr. Fink has given to establish the fund. Dr. Roeber was one of the founders of the society. In passing, it may be added that in bestowing the award on Dr. Fink an enumeration of his various achievements included work on contact catalysis, ductile tungsten, platinum substitute, insoluble anodes, chromium, tungsten plating and aluminum plate.

The War Department has allotted \$3,600,000 for channel stabilization on the lower Missouri River between Kansas City and the mouth of the river above St. Louis.

In anticipation that the United States will grant a credit of fifty million dollars to Soviet Russia, various Russian commissariats already are preparing a list of orders to be placed here.

雅各
鑽 鑽 鉗

YOU can't read this—neither can we. But to the Chinese engineer in Singapore it means the finest there is in Drill Chucks.

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No machine shop in the world has heavier work or more diversity of work than do Midvale shops. And Midvale has found, by 60 years' experience, it can use no better steel than Midvale Tool Steel. It comes to Midvale workmen from the same warehouse that supplies you.

Your tool steel is just as important to you as it is to Midvale. It affects quality of work, cost of work, and volume of production. Write or phone The Midvale Company at its nearest office: Philadelphia, New York, Washington, Pittsburgh, Cleveland, Chicago or San Francisco.





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You can be sure of the quality of your forgings by insisting on ASCO Forging Billets. Our metallurgical laboratories are at your service in developing special steels for your individual needs.

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Chrome Molybdenum
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Molybdenum
Nickel
Nickel Molybdenum

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JUST BETWEEN US TWO

Warts Like Mountains

What gripes us are the "arty" photographs some advertisers and editors favor. You know, those pictures taken at a trick angle that distort the subject almost beyond recognition. The warts on a pickle are made to look like Himalayas. Maybe it's art but we know what we like.

We wouldn't take a bushel of 'em for one honest-to-God human-interest photograph like the one Bethlehem used on page 10 of the Oct. 12 issue. Congrats to the man who made it.

C-R-R-Runching

We want to give a hand, too, to the SKF people for that vivid hand-lettering of the word "CRUNCHING" on page 7 of Oct. 12 Iron Age. A smart example of what *Advertising & Selling* aptly terms onomatopoeia.

Cribbed

Ayer's T. Harry Thompson scores in *Printers' Ink* the cleverest crack we've seen in many a day:

"It will be heartening to hear General Johnson say, 'Don't sneer, Boys; the poor devils are buying.'"

We Can Hardly Wait for Our Turn

After tossing those orchids, we'll let someone sock us with one. One of the liveliest sales promotion men in the industry writes:

"The price insert published in your Sept. 21 issue was indeed an excellent piece of editorial enterprise and we have found it exceedingly valuable to us."

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"Thank you very much for the routing slips," writes John Bertram & Sons Co., Ltd., machine tool builders of Dundas, Canada. "We find them a great convenience in keeping The Iron Age moving through our plant." Requests for routing forms are swamping us, but if you haven't received yours, make a list of your Iron Age readers and send it to us at 239 W. 39th St., New York City. You'll get a year's supply pronto, free. And when they're gone, ask for more.

**Quick, Doc Vizetelly, a
Synonym!**

*We hope his plans will al-
ways fizzles*

*Whose every other word is
"chisel."*

Cracked but Clever

The crank who wrote us that letter we mentioned an issue or two ago has a shrewd way of beating Uncle Sam out of two-cents postage. He addressed the letter to himself and put our address in the upper left hand corner of the envelope as the return address. Then he mailed the letter without a stamp. He figured that the post office people would believe we were the sender and would return the letter to us. Which is exactly what they did.

My, What a Handsome Bird!

We read in the paper that Gen. Johnson is sore at Messrs. Kiplinger and True, Washington correspondents, for pointing out great open spaces in the blue eagle's tail feathers. The paper says he won't let them in at the press meetings. Say it isn't so, Gen. If it is, we'll lay off references to one-point landings, moulting, etc., because they might reflect on "Moff," our Washington editor (L. W. Moffett to you). "Moff" writes that popular feature, "This Week in Washington," appearing regularly in The Iron Age.

—A. H. D.